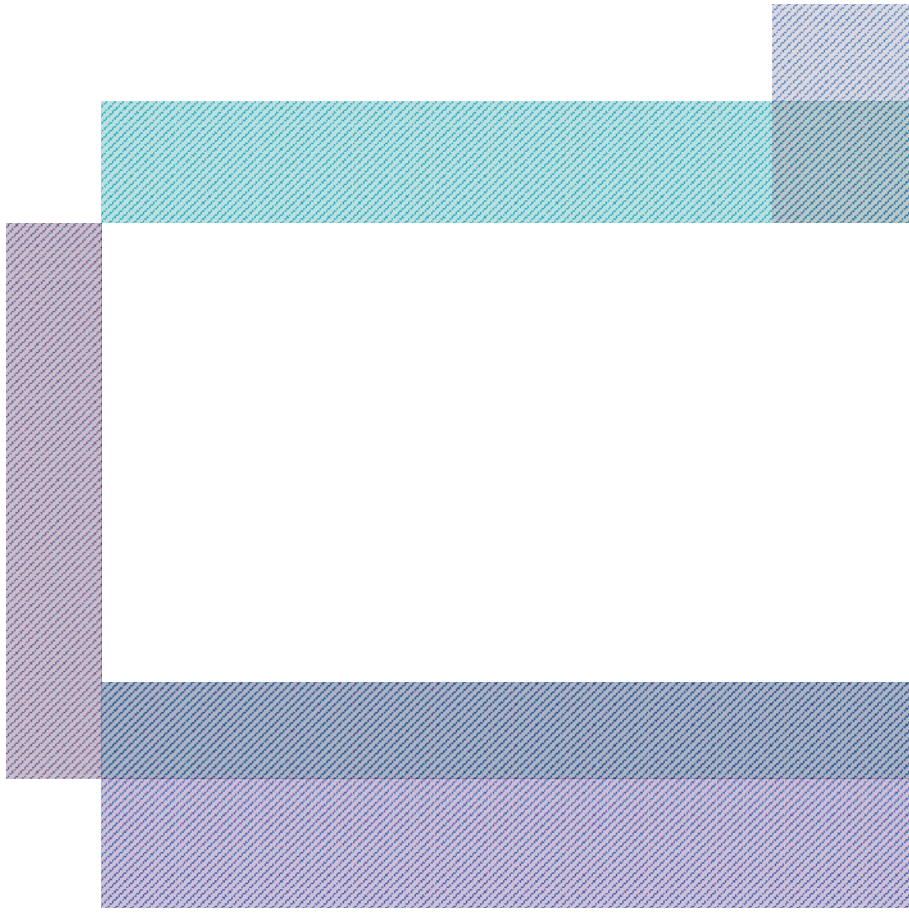


**BELGIAN REPORT
ON SCIENCE,
TECHNOLOGY AND
INNOVATION
2010**

Belgian
Science
Policy
Office







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Table of Contents

- 1. Institutions and competences for STI policy in Belgium, 5**
 - 1.1 Belgium, a federal country, **7**
 - 1.2 Who does what in the Belgian STI policy system, **8**
 - 1.3 Co-operation and consultation between Belgian entities, **12**
 - 1.4 A snapshot of Belgium science and innovation performance, **14**
 - 1.5 Funding of STI policies in Belgium, **17**

- 2. Federal Government policy in favour of science, technology and innovation, 21**
 - 2.1 Objectives of the federal science policy, **23**
 - 2.2 Actors and instruments of the federal STI policy, **25**
 - 2.2.1 Federal Council for Science Policy (FCSP), **26**
 - 2.2.2 Belgian Federal Science policy Office (BELSPO), **27**
 - 2.2.3 Other Federal public services, **28**
 - 2.3 Implementation of Federal science policy, **32**
 - 2.3.1 Funding Belgian participation in international research, **33**
 - 2.3.2 Federal research programmes, **39**
 - 2.3.3 The federal scientific establishments, **46**
 - 2.3.4 Support to R&D activities and policy, **50**
 - 2.4 Perspectives for Federal STI policy, **52**

- 3. Flemish science, technology and innovation policy, 57**
 - 3.1 General orientations of Flemish STI policy, **59**
 - 3.2 Actors and instruments of the Flemish STI policy, **62**
 - 3.2.1 Policy advice, **64**
 - 3.2.2 Government departments, **64**
 - 3.2.3 Other bodies of public interest in the field of science and innovation, **66**
 - 3.2.4 Implementing agencies, **67**
 - 3.2.5 Innovation intermediaries, **77**
 - 3.3 Main research and innovation performers, **82**
 - 3.3.1 Higher education institutions, **82**
 - 3.3.2 Strategic Research Centres, **85**
 - 3.3.3 Scientific institutes, research infrastructure and knowledge centres, **92**
 - 3.3.4 Internationalisation of Flemish research and innovation, **96**
 - 3.4 Perspectives for the Flemish STI policy, **101**

<p>4. STI policy in Wallonia and in the French Community, 105</p> <p>4.1 General orientations of STI policy in Wallonia and in the French Community, 107</p> <p>4.2 Actors and instruments of STI policy in Wallonia and in the French Community, 109</p> <p>4.2.1 Policy advice, 109</p> <p>4.2.2 Government departments, 112</p> <p>4.2.3 Other implementing bodies, 122</p> <p>4.2.4 Innovation intermediaries, 132</p> <p>4.2.5 Main research and innovation performers, 134</p> <p>4.3 Perspectives for STI policy in Wallonia and in the French Community, 143</p>	<p>1 Understanding Belgium: federal, community and regional authorities, 8</p> <p>2 Regional presence of collective research centres, 11</p> <p>3 Belgian STI policy system, 12</p> <p>4 A snapshot of Belgium's comparative STI performance, 15</p> <p>5 Overview of government budgets allocated to R&D (thousand current euro), 17</p> <p>6 Share of public funding for R&D (GBAORD and tax credits) by Belgian authority, 2009, 18</p> <p>7 Evolution of budgetary credits for R&D policy of the federal government, 1998-2008, in €m, 24</p> <p>8 Budget detail for federal science policy in Belgium, 2008, 25</p> <p>9 Funding of R&D through tax measures (tax revenue foregone in €), 29</p> <p>10 FP6 participation by theme and activity, 35</p> <p>11 Thematic specialisation index of Belgium in FP6 vs EU27, 36</p> <p>12 Federal research programmes: indicative annual funding (2005-2010, million euro), 41</p> <p>13 Funding of Federal Scientific Institutions within BELSPO (2003-2010), 46</p> <p>14 Flemish STI policy system, 63</p> <p>15 VIS project and programme types, 70</p> <p>16 Innovation support in Flanders by type, 71</p> <p>17 FWO support types, 72</p> <p>18 PMV risk capital and investment instruments, 76</p> <p>19 Collective research centres in Flanders, 81</p>
<p>5. STI policy in Brussels-Capital Region, 149</p> <p>5.1 General orientations of STI policy in Brussels-Capital Region, 151</p> <p>5.2 Actors and instruments of STI policy in Brussels-Capital Region, 154</p> <p>5.2.1 Science Policy Council of Brussels-Capital Region, 154</p> <p>5.2.2 Government departments and agencies, 155</p> <p>5.2.3 Innovation intermediaries, 163</p> <p>5.2.4 Main research and innovation performers, 165</p> <p>5.3 Perspectives for STI policy in Brussels-Capital Region, 167</p>	
<p>6. Conclusions and perspectives, 171</p>	

Boxes

20	Funding of universities in Flanders, 84		
21	Flemish participation to EU FP – share by type of organisation, 97		
22	Flemish participation in FP6, 97		
23	Structure of the French Community and the Walloon Region, 111		
24	Government budgetary appropriations on R&D (in thousands €), 113		
25	Budget appropriations for R&D of DGO6 per funding source (in thousand €), 113	1	Collective research centres – a ‘Belgian institution’, 10
26	R&D budget appropriations of the Walloon Region by type of programme, 2001-08, (in thousand €), 114	2	Fiscal measures in favour of R&D activities, 19
27	R&D budget appropriations of the Walloon Region by type of beneficiary, 2001-2008 (thousand €), 115	3	Federal policy and support for intellectual property, 30
28	Amounts awarded for Horizon-Europe, per category of actor, in thousand €, 116	4	Back to Belgium, international mobility of researchers, 33
29	Additional funding allocated by the Walloon Region to accredited research centres and companies for participation in FP6, 116	5	Federal space research policy, 38
30	Number of participations to funded projects by Walloon organisations, 117	6	Inter-University Attraction Poles, 40
31	FIRST schemes – number of mandates granted per year and budget (in thousand €), 118	7	Federal Programme ‘Science for sustainable development’, 43
32	Programmes of excellence in Wallonia (€ thousand), 119	8	The Belgian Polar Platform, 43
33	SMEs R&D and innovation measures in Wallonia (€ thousand), 120	9	Examples of research actions of other federal public services, 44
34	Budgets allocated to R&D policy in the French Community, 2008, 121	10	Federal scientific institutions, 47
35	List of collective research centres accredited by the Walloon Region, 138	11	Federal institutes in the field of human and animal health, 48
36	Trend in budgetary appropriations for accredited research centres (thousand euro), 139	12	Nuclear research, 48
37	Competitiveness poles: Budgetary allocations of the Walloon Region per type of beneficiary, 2001-2008, 142	13	BELNET: the network of knowledge, 50
38	Initial public budgets for R&D in Brussels-Capital, 2004-2009 in million €, 153	14	R&D business support (2 types: industrial R&D projects and R&D feasibility studies), 68
39	PRFB, 2004-2008, 161	15	Post-doctoral Research Fellowships (OZM), 69
		16	Strategic Basic Research (SBO), 69
		17	VIS: Co-operative Innovation Networks, 70
		18	Odysseus, a Flemish brain gain programme, 74
		19	A top knowledge economy based in three countries: ELAt, 100
		20	Promoting participation in EU programmes, 115
		21	FIRST measures, 117
		22	Mobilising programmes, 118
		23	Programmes of excellence, 119
		24	Support to R&D for SMEs, 120
		25	FNRS development plan (2004-2009), 123

26	Popularising science and developing a scientific culture in French-speaking Belgium, 125
27	A partnership for researchers: action Plan of the French Community 2010-2014, 126
28	www.innovons.be – a novel resource for Walloon innovators, 129
29	Universities of the French Community, 135
30	The Concerted Research Actions (ARC) & The Special Research Fund (FSR), 136
31	WELBIO: Walloon Institute for Life Sciences Lead, 137
32	Regional impulse programmes, 158
33	Brains back to Brussels (BB2B), 158
34	Spin-off in Brussels, 159
35	Brussels Studies, 163
36	Incubators in the Brussels-Capital Region, 164
37	Belgian Presidency Priorities, 177

Preface

Some ten years ago have passed since the last Belgian Presidency of the European Union (EU), but as in 2001, the 2010 Belgian EU Presidency comes at a time of enormous challenges and the launch of initiatives with a 10 year time horizon. In 2001, the Lisbon Agenda and, the subsequent Barcelona goals of investment in R&D, underlined that the EU Member States needed to work together towards common goals.

The Europe 2020 Strategy¹ put forward by the European Commission in April 2010 calls for a new focus on smart, sustainable and inclusive growth. Smart growth implies developing an economy based on knowledge and innovation and builds on the considerable efforts since 2000 to boost the EU's investment in and output from science, technology and innovation (STI). Yet, the strategy acknowledges that investment in science that leads to results confined to the laboratory, technology implemented without taking into account environmental or social impacts, or innovation products or services that do nothing to improve quality of life, reduce our impact on climate change and reduction of biodiversity

As this report aims to underline, the Belgian authorities have anticipated many of these trends in the focus of policy objectives and have sought to reinforce cooperation within the federalised institutional structure of governance to deliver a coherent 'policy-mix' in favour of STI. Moreover, the Belgian authorities have increased public investment over the last decade and also taken action to improve the effectiveness of scientific and business innovation funding and support agencies and organisations to ensure 'value for money'.

This 2010 Belgian Report on Science, Technology and Innovation (BRISTI) distils in a clear and structured manner the significant and important efforts of the Belgian federal, regional and community governments in favour of the sort of smart, sustainable growth, the EU is aspiring to achieve by 2020.

I commend this report to all stakeholders involved in the on-going debate on European research and innovation priorities and, in the name of all the contributors, hope that the insights of this report contribute to achieving a strong and unified European research and innovation area.



Dr Philippe METTENS

Chairman of the Board of Directors, Federal Science Policy Office (BELSPO)

1. http://ec.europa.eu/eu2020/index_en.htm

Introduction

The first Belgian Report on Science, Technology and Innovation (BRISTI) was published in 2001, during the previous Belgian presidency of the European Union (EU). Although an update was published online in 2005², this is the first full update in close to a decade and is published in view of the 2010 Belgian Presidency of the EU³. Like the previous report, this report a) sets out the institutional environment in which scientific research, technological development and innovation (STI) takes place in Belgium; b) highlights the current policy orientations of the Belgian authorities with responsibility for STI and places them in the context of the EU level priorities. Rather than provide a ‘historical’ overview of changes over the last decade, the report seeks to provide an up to date snapshot of the STI system. The report also discusses the contribution of Belgian STI policies to the construction of the European Research Area (ERA), to promoting a more innovative Europe (including non-technological innovation, etc.) and more generally to the goal of smart, sustainable growth set by the Europe 2020 strategy.

Why should a reader of this report from another EU country be interested in the development and focus of STI policy in Belgium? First of all, because Belgium has a long history in excellence in higher education and research dating back to the founding of the Catholic University in Leuven in 1425. Today, many Belgian academic research centres and scientific institutions remain at the forefront of research in specific fields, co-operating at European and global levels to pursue scientific ‘roadmaps’ and seeking to attract foreign scientists to work on projects or to locate permanently in the country.

With a highly productive industrial sector and strong presence in specific services, the Belgian economy is one of the most open in the world; both in terms of trade and via the high penetration of inward investment in the national economy. Business innovation in Belgium is driven by a number of key sectors including pharmaceuticals, chemicals, biotechnology, microelectronics, and space and satellite communications. A sizeable share of business R&D is concentrated within a limited number of multinational firms that have established or taken-over research & development (R&D) facilities in Belgium. There is, also, a substantial R&D effort by a larger number of smaller firms often clustered in specific fields of expertise.

2. http://www.belspo.be/belspo/home/publ/pub_ostc/BRISTI/BRISTI04_fr.pdf
3. <http://eutrio.be>

Institutionally speaking, Belgium is a ‘mini-Europe’, each of the federated authorities (regions and linguistic communities) is singularly competent for the areas of STI granted to it by the law. The long process of decentralisation, which began in the 1970s, has led to a fascinating differentiation of institutions and policies adapted to the STI potential, and the social and economic needs of each part of Belgium and its different entities.

A companion volume⁴ provides an in-depth analysis of data and trends in indicators on Belgian R&D and innovation. This volume of the BRISTI report⁵ sets out a detailed description of the STI institutional and policy system⁶. The policy ‘mapping’ complements the statistical data and puts into context the choices made by the Belgian authorities in terms of policy objectives and instruments to meet the challenges specific to each region, or common to the country as a whole.

This volume is organised in four main sections, one for each of the Belgian entities:

- The Federal Government
- Flemish Government
- The French Community and Wallonia, and
- The Brussels-Capital Region.

For each authority, the report sets out their current policy objectives for STI, the main actors and implementation measures and a perspective on future orientations of policy, notably in the context of the European Commission’s Europe 2020 Strategy, and the future European Research & Innovation Plan.

A final section provides a critical perspective on future options for STI policy for the federalised Belgian system in the context of the ERA.

4. See Key data on Science, Technology and Innovation – Belgium, 2010

5. This volume has been written by representatives of the Belgian Authorities; supervised and edited by an independent expert.

6. Work on this report was concluded in March 2010 and wherever possible the most up to date information was used. Budgetary data and statistical indicators mainly refer to the last available year (2008 in most cases).





1. INSTITUTIONS AND COMPETENCES FOR STI POLICY IN BELGIUM

1.1

Belgium, a federal country

Belgium is a federal country⁷ composed of seven autonomous entities: the Federal State, the three regions and three communities. Each entity elects its own government and parliament and establishes all regulations and institutions necessary to ensure effective government within its realm of responsibilities. Each entity has exclusive powers in a number of areas:

- the Federal Government is competent for areas of national interest, such as, defence, justice, monetary and fiscal, social security and important elements of health policy and research.
- the communities act in fields pertaining to the needs and rights of individual citizens; notably primary, secondary and higher education, scientific research and culture. The concept of ‘community’ refers to persons that make up a community and the bond that unifies them, namely their language and culture. The country has three official languages: Dutch, French and German, and, hence, three communities: the Flemish Community, the French Community and the German-speaking Community.
- the country is divided into three regions: Brussels-Capital, Flanders and Wallonia. The creation of the regions responded to the need to develop socio-economic policies adapted to the specific needs of each territory. Economic development, innovation, land use, environment and natural resource management and agriculture are among the major competences of the regions.

In practice, the Flemish region and the Flemish Community merged to form a single government, parliament and administration. The French Community and the Walloon Region are pursuing the same objective by reinforcing collaboration at governmental level.

FIGURE 1 presents graphically the institutional structure of Belgium in 2010.

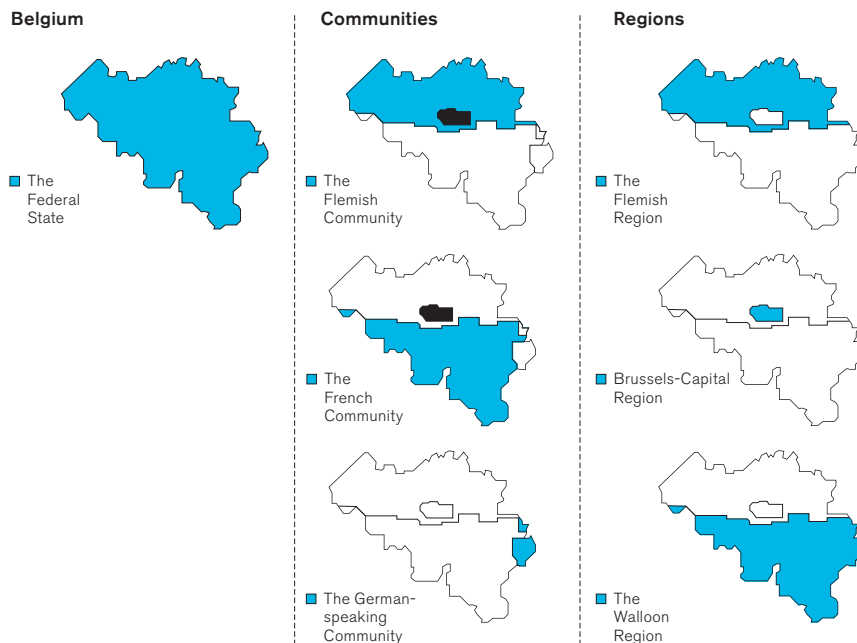
7. Five main constitutional reforms, that took place in 1970, 1980, 1988/89, 1993 and 2001, have progressively put in place the legal framework and the institutions necessary for the establishment of a Federal State. The last institutional reform in 2001 concerned the devolution of competence for foreign trade, agriculture and development to the regions.

1.2

Who does what in the Belgian STI policy system

As illustrated in **FIGURE 3**, all the Belgian authorities⁸ have advisory councils, ministerial portfolios and administrative departments and implementing agencies, with diverse responsibilities for the design, the implementation and the evaluation of STI policy, within their field of competence. The institutional structure has evolved from a ‘common base’ since the 1980s as each of the authorities chose their ‘own road’ in terms of ministerial and departmental responsibilities, creation of agencies, orientation of their STI policy mix, etc. As a result, certain organisations that continue to have a national mandate, such as the collective research centres, increasingly fulfil specific missions related to regional/community policy objectives (see **BOX 1** and **FIGURE 2**).

FIGURE 1 Understanding Belgium: federal, community and regional authorities



8. The German-speaking Community, although officially, like the other Communities, entrusted with science policy has not yet developed a policy in this area; since it does not host any scientific institution (university, research centre, etc.). In practice, support to innovation in enterprises located in the German-speaking Community is provided via the Walloon Region.

Before exploring the institutions and policies of the Belgian federal and sub-national entities, it is instructive to present the specific powers and competence of each authority in the field of STI.

The Federal Government is competent for the scientific research necessary for it to perform its own general competences; scientific research (such as space, climate and Antarctic research including the Princess Elizabeth Station) within the framework of international or supra-national agreements; networks of data-exchange on a national or international basis (BELNET); the federal scientific institutes and museums; programmes and actions requiring homogenous execution at national or international level (including national networks for basic research); the maintenance of a permanent inventory of the country's scientific potential; Belgian participation in activities of international research bodies.

The Federal Government can also take any action in areas belonging to the competences of the federated entities, if acting on the basis of an opinion expressed by the Federal Council for Science Policy. These actions must, furthermore, either be related to an international agreement or refer to actions and programmes going beyond the interests of one community or one region.

In addition, the Federal Government retains responsibility for a number of other key fields of policy with an influence on STI performance, notably a strong intervention through fiscal incentives to encourage the recruitment of researchers (by universities, researchers and enterprises), scientific visas, intellectual property law, etc.

The communities are competent in the following areas: research related to education, culture and other individual matters, such as health policy, and personal assistance. This covers both research in these areas as well as research conducted by organisations of the sectors concerned, namely universities and other higher education institutes. It can be said that communities have the main responsibility for fundamental research in universities and applied research in higher education establishments, including international activities of these institutions. They are also in charge of popularisation and communication of science.

The regions are competent in the following areas: applied industrial research related to the economy, energy policy, public works, telecommunications, environment, transport, water, preservation of nature, land, agriculture, trade, employment. In terms of innovation regional support and subsidies covers the development of new products and processes in small and medium-sized enterprises (SMEs), technology transfer, public research organisations, venture capital, and science parks and incubation centres (supporting start-ups). In short, the regions have the main responsibility for economically oriented research, technological development and innovation promotion.

The distribution of responsibilities in STI across the various authorities in Belgium is based on fields of competences, rather than on the actors. This is illustrated by the case of universities, major players in the Belgian research system. Whereas the Communities are competent for and fund research at all higher education institutions (HEI), both universities and university colleges⁹, the Federal Government and the regions can also fund projects of HEIs for STI activities in their own realm of competences. Concretely, this means that HEIs may receive funding from federal, regional or communities (according to their location and their linguistic regime), but for different purposes and with different conditions attached to the finances received.

Increasingly, the core of STI policy, described in this report, is inter-linked with other policy areas with an influence on innovation in the broader sense. This concerns economic policy, a regional competence (under which fall, for example, start-up promotion and risk capital provision) and environmental policy (with the push to promote green or 'eco-innovation') or federal competences such as fiscal policy (e.g. tax breaks for R&D activities.) or social security (e.g. issues related to the social security regime of researchers), etc. In such areas policy initiatives and instruments are developed that may in some cases have a major impact on STI and this requires, increasingly, consultation amongst the Belgian authorities to ensure an optimal outcome in terms of research and innovation potential.

BOX 1 **Collective research centres – a 'Belgian institution'**

A core feature of the Belgian 'innovation system' is the so-called collective research centres created by the 1947 'De Groote' law. The law envisaged the creation of industrial R&D centres focussed on supporting technical improvements in specific sectors and acting as research centres to carry out activities with the objective to generate (through R&D activities) and acquire (through technology transfer) knowledge. Hence, collective research centres are private initiatives in which member firms initiate, often through technical committees, topics for R&D. The

private character is reflected by the fact that the majority of funding originates from either compulsory (in the case of the Centre 'De Groote') or voluntary membership fees from firms in the sector concerned. However, the collective research centres are also recognised by the public sector as instruments to enhance competitiveness by stimulating R&D and technology transfer. Public funding is, therefore, obtained from the different authorities in Belgium according to the region in which the centre is located.

Three types of collective research centres exist: (i) the centre 'De Groote'; (ii) the assimilated collective research centres; and (iii) the 'autonomous' collective research centres. The first two operate in all Belgian regions; the latter reflect the regional mandate for science and technology policy developed since the 1990s. The policy and institutional framework in which they operate is of importance since it influences their mission and their functioning, and; hence, their capacity to impact on the industrial performance of the sector. A previous funding formula based on an agreed share between

9. 'Hogeschool' in the Flemish system and 'Hautes Ecoles' in the French Community, the term university college is used hereafter.

Federal and regional authorities was discarded in the early 2000s. At the current time, the Federal Government, which prior to the 1990s provided a considerable part of their funding, now only funds a limited part of their activities; while the regional authorities have shifted funding from an 'operating grant' to a project or contract of objective type funding mechanism.

In 2010, the Federal Government funds the centres for three main tasks: pre-normative research projects; standardisation and patent support services.

Since 2002, the Flemish Government supports collective research, notably, through the Flemish Cooperative Innovation Networks (VIS) programme. All the De Groote and equivalent centres are eligible for funding under the VIS programme. In 2002, the Walloon Region put in place a criteria based system for accrediting research centres for the collective nature of their R&D and technological services. Such accredited collective research centres are eligible to submit proposals for funding of collective research projects and for the funding of

technological guidance services. Amongst the 23 accredited collective research centres, 10 are De Groote centres or assimilated. The Walloon Region has set an upper limit for funding annual budgets of the centres to 50% of the total budget. Finally, the Brussels Capital region also funds the collective research centres located in the region through project based funding of services and specific R&D funding programmes.

FIGURE 2 Regional presence of collective research centres

COLLECTIVE RESEARCH CENTRE	REGIONAL PRESENCE		
	BRUSSELS-CAPITAL REGION	FLEMISH REGION	WALLOON REGION
CENTEXBEL-Textile	x	x	x
CRIC-Cement	x		
BCRC-Ceramics			x
SIRRIS-Technologie	x	x	x
BRRC-Road	x	x	x
BBRI-Building	x	x	x
CTIB-TCHN-Wood	x		
WTOCD-Diamand		x	
CoRI-Coating			x
CRM-Metallurgy		x	x
BWI-Welding	x	x	x
BPI-Packaging	x	x	

Source: Spithoven A., M. Knockaert & C. Vereertbrugghen, (2009) *Collective Research Centres: A Study on R&D and Technology Transfer Involvement*, BELSPO.

1.3

Co-operation and consultation between Belgian entities

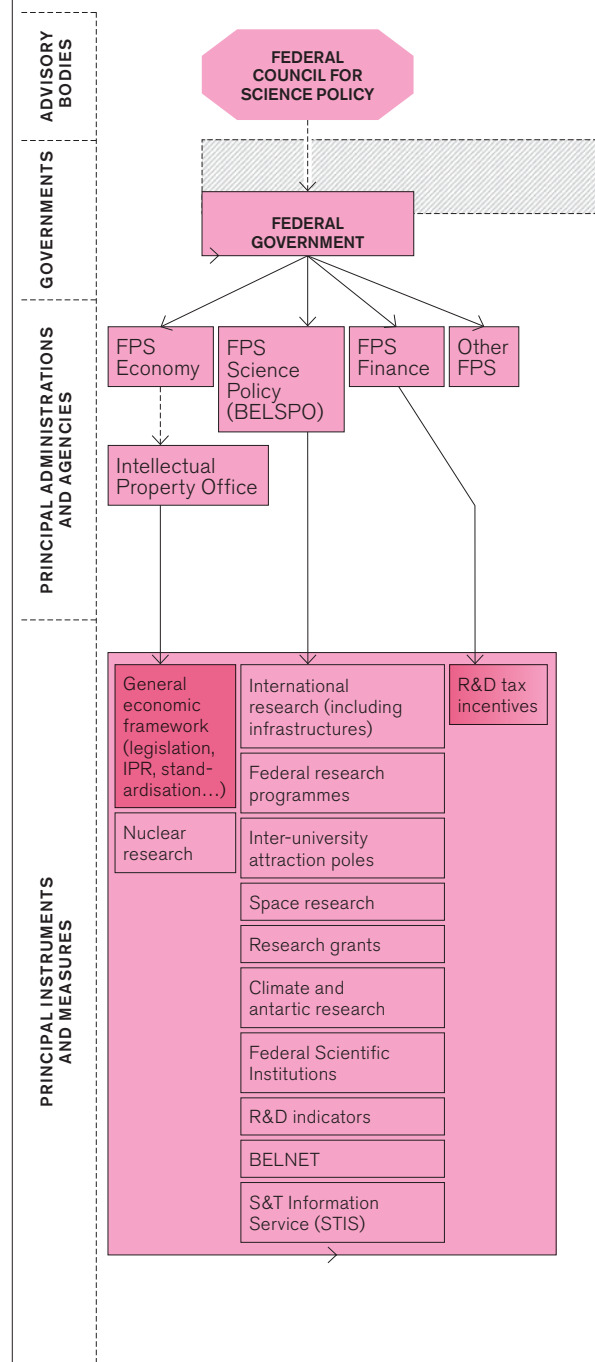
The distributed competence for STI matters across the Belgian authorities implies the need for co-ordination on both a permanent and ad hoc basis. Co-ordination and consultation between the Belgian authorities is organised through a committee that structures dialogue on all matters requiring concerted action at national level. The Inter-Ministerial Conference on Science Policy (CIMPS-IMCWB) is the co-ordination instrument between the Federal State, the Communities and the Regions, composed of those members of respective governments having responsibilities in science policy matters¹⁰.

The CIMPS-IMCWB has established two permanent administrative sub-committees, attended by representatives from each authority: the International Co-operation Commission (CIS) for international matters, and the Federal Co-operation Commission (CFS) for national matters.

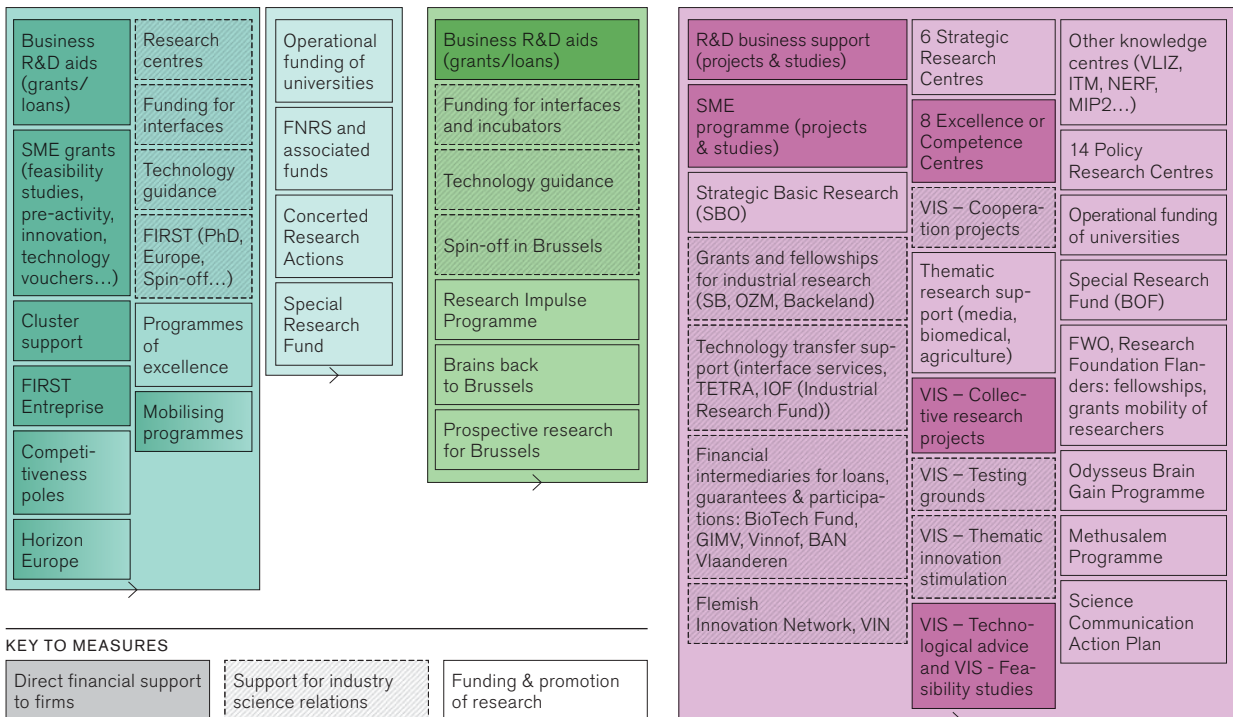
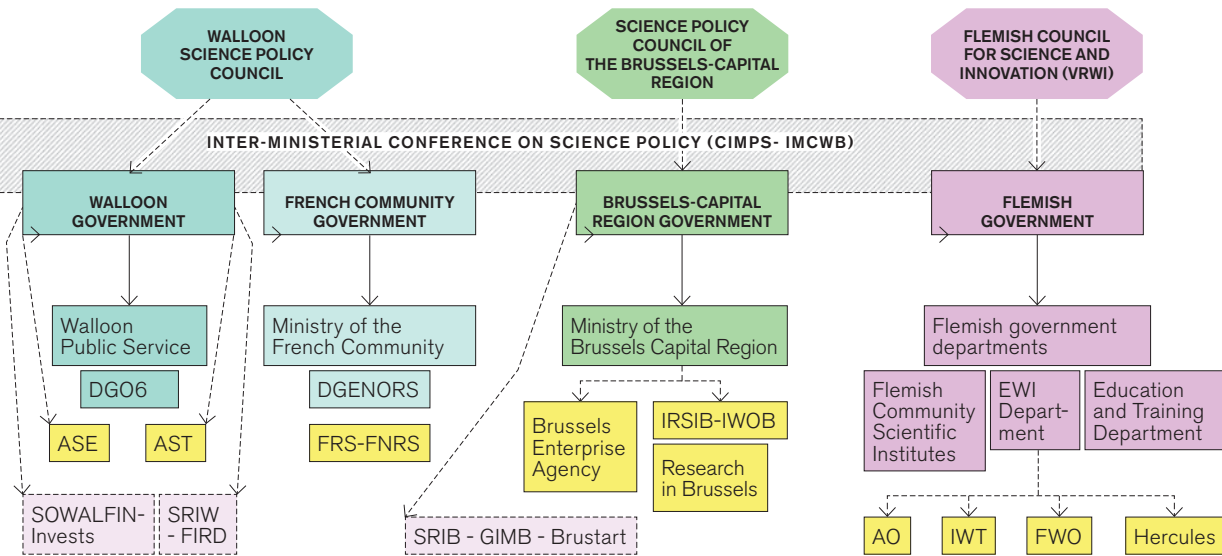
Examples of matters dealt by these committees are the permanent inventory of scientific potential in Belgium, or the positioning of Belgium in the EU's Seventh Framework Programme for Research and Technological Development (FP7).

10. A similar Commission exists for economic affairs: the Inter-Ministerial Economic Commission (CEI-IEC).

FIGURE 3 Belgian STI policy system



Source: Reid A., Bruno N., 2010



1.4

A snapshot of Belgium science and innovation performance

The accompanying volume to this report entitled 'Key data on science, technology and innovation, Belgium, 2010, produced by the Federal Cooperation Commission on Statistics (CFS/STAT) provides an in-depth view into the recent trends of the major STI indicators. This section, therefore, offers a rapid snapshot of some key indicators to set the scene for the policy and institutional framework in Belgium.

FIGURE 3 provides a comparison of Belgian STI performance compared to Spain and Hungary (respectively the preceding and future holders of the EU presidency), Belgium's four main European trading partners (Germany, France, the Netherlands and the United Kingdom), the EU27 average, the United States and Japan. The data presented is for the most recent year available (generally 2007).

Belgium performs relatively well in terms of input indicators (notably business expenditure on R&D (BERD) and R&D personnel) as well as on the majority of output indicators (notably publications). As highlighted in a range of recent reports, Belgium's relatively strong position (compared to the EU27 average) in BERD is due to a high level of investment by (a limited number of) foreign affiliates. The dependence on foreign involvement is on the one hand, positive, in an age of 'open innovation' and globalised technology flows, but, also, a threat, making's Belgium's STI performance vulnerable to decisions of multinational firms. This is particularly true, since government budgetary appropriations on R&D (GBAORD) as a % of GDP remains below the EU27 average despite a positive trend upwards in recent years.

In terms of outputs, a strong 'research' productivity performance, in terms of patents (notably in biotechnology, where Belgium is amongst the most productive in the EU27) and scientific publications, does not translate into a direct 'innovation bonus' since innovation indicators tend to be around or below the EU27 average. This 'under-performance' may be linked to a weak entrepreneurial rate of activity, an issue the Belgian authorities have been seeking to address over the last decade. These broad conclusions are confirmed by the European Innovation Scoreboard (EIS)¹¹ 2009 which positions Belgium amongst the group of innovation followers (along with Austria, Cyprus, Estonia, France, Ireland, Luxembourg, the Netherlands and Slovenia) with innovation performance below those of the Innovation leaders (Denmark, Finland, Germany, Sweden and the UK) but close to or above

11. All EIS reports mentioned can be downloaded at:
<http://www.proinno-europe.eu/projects/homepage/public/1435>

that of the EU27 average. In terms of trends, the EIS calculated growth in innovation performance using data over a five-year period (2004-2008), based on absolute changes in the indicators. Belgium's rate of improvement is slightly below the EU27 average and behind that of innovation leaders such as Finland and Germany.

The EIS2009 identifies Belgium's relative strengths, compared to the country's average performance, in linkages & entrepreneurship and innovators and economic effects, while relative weaknesses are in firm investments and throughputs. Over the past five years, finance and support and throughputs have been the main drivers of the improvement in innovation performance, in particular as a result from strong growth in Venture capital (17.8%). Performance in Firm investments and Innovators has worsened, in particular due to a decrease in non-R&D innovation expenditures (-8.5%).

Considering the effect of the financial crisis between late 2008 and early 2009 on innovation in Belgium, the results from the Innobarometer 2009 are encouraging: as a direct effect of the crisis, 23% of EU27 innovators decreased their innovation expenditures, however Belgian innovative firms had one of the lowest percentages (15%), while only 14% of Belgian innovating firms, the lowest national figure in the EU27, thought their innovation expenditures will decrease in 2009 as compared to 2008, compared to 29% for the EU27.

FIGURE 4 A snapshot of Belgium's comparative STI performance

	BE	ES	HU	DE	FR	NL	UK	EU-27	US	JP
A. INPUT INDICATORS										
GERD in % of GDP	1.90	1.27	0.97	2.53	2.04	1.71	1.82	1.77	2.66	3.44
BERD in % of GDP	1.37	0.54	0.35	1.72	1.41	0.97	1.16	1.11	1.83	2.36
Total R&D personnel per thousand total employment	13.2	9.8	6.2	12.8	14.5	10.3	11.1	10.4	..	14.6
Total researchers (full time equivalent) per thousand total employment	8.3	5.9	4.2	7.3	8.4	5.8	8.1	6.4	9.7 (2006)	11.0
Tertiary graduates in science and technology (per 1000 of population aged 20-29)	14.0	11.2	6.4	11.4	20.7	8.9	17.5	..	10.1	14.4
GBAORD in % of GDP	.68	1.00	.43	.79	.75	.70	.64	.72	.99	.70
B. OUTPUT INDICATORS										
Technology balance of payments (receipts in % of GERD)	79.4	36.3	196.9	53.2	68.1	..	22.2	14.0
Technology balance of payments (payments in % of GERD)	91.3	50.6	276.0	47.2	35.2	..	13.1	4.0

	BE	ES	HU	DE	FR	NL	UK	EU-27	US	JP
B. OUTPUT INDICATORS										
The average publication output per 10,000 inhabitants (period 2004-2008)	13.0	7.7	5.0	9.4	8.8	15.0	13.2	7.4	9.9	6.1
Number of patent applications to the EPO (priority year) per million population	142.3	32.9	16.8	297.0	131.3	213.6	87.5	117.0	112.7	169.3
Number of patent applications to the USPTO (priority year) per million population	166.3	21.5	19.2	287.0	126.2	241.0	150.3	122.4	799.9	616.7
C. INNOVATION INDICATORS										
Share of turnover from product innovation (% of total turnover) – manufacturing (2004)	17.8	16.7	9.8	26.1	17.1	13.9	18.5	18.9	..	4.8
Share of turnover from product innovation (% of total turnover) – services (2004)	10.4	12.4	5.4	11.8	7.5	5.2	12.8	10.4	..	4.8

Source: CFS/STAT, OECD MSTI 2009-2, Eurostat, Web of Science

Looking below the national level, the European Commission's EIS Regional Innovation Scoreboard 2009 report places all three Belgian regions in the group of 'medium-high innovators' (Flanders having shifted from high to medium-high between 2004 and 2006 data sets studied in the report). However, while on a European level benchmarking exercise the three regions perform relatively similarly, regional strengths and weaknesses are somewhat different conforming to the socio-economic profile, the sectoral specialisation of the economies, the specialisation of the research base, the (un)employment rate, entrepreneurial activity rates and propensity to innovate, etc. For instance, the highly urbanised Brussels-Capital Region is strongly service sector dominated, while the Flemish region economy is more highly industrialised, in terms of the share of manufacturing in regional value added, than either of the two other regions. In particular, Flanders has a much higher share of employment in high-tech manufacturing than the other two regions.

The companion 'key STI data' report highlights a number of these regional differences. For instance, there is a relative concentration of research activities in Flanders (61% of intramural R&D expenditures in 2007, 64% in 2002) even if Wallonia has improved its share in recent years (26% compared to 23%, an indeed has the highest R&D/GDP share of the Belgian regions), notably thanks to an improved position in terms of BERD (share in Belgium total increasing from 24% to 29% between 2002-2007, an absolute as well as relative increase). Figures for the share of researchers by region are, as would be expected, in line with the R&D expenditure shares.

1.5

Funding of STI policies in Belgium

Over the last decade, the Belgian authorities have made a strong commitment to the EU's objective to invest 3% of gross domestic product (GDP) on R&D¹² (of which 2% from business and 1% from public authorities). Government budgetary credits for R&D (GBAORD) have grown almost every year from 2000 to 2008¹³ in each of the Belgian authorities.

FIGURE 5 Overview of government budgets allocated to R&D (thousand current euro)

AUTHORITY	1998	2000	2002	2004	2006	2008	2009i
FEDERAL GOVERNMENT (GBAORD & tax credits)	459 809	476 225	478 841	505 310	511 042	877 690	962 880
FLEMISH GOVERNMENT	518 260	595 684	706 188	820666	967 954	1 121 429	1 146 966
FRENCH COMMUNITY	202 760	210 819	222 498	228841	245 796	272 768	290 608
WALLOON REGION	103 957	132 597	184 259	139713	200 019	332 113	330 982
BRUSSELS CAPITAL REGION	10 935	7 903	14 060	18789	20 855	24 988	29 091
TOTAL GBAORD & TAX CREDITS	1 295 720	1 423 228	1 605 845	1 713 320	1 945 666	2 628 988	2 760 527

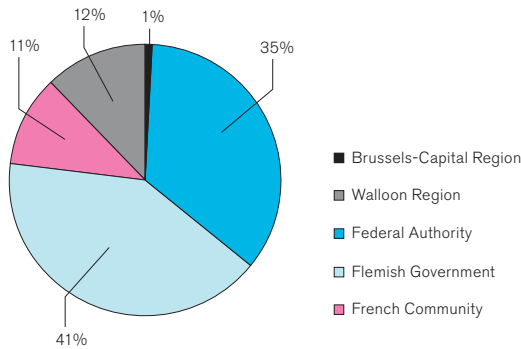
Source: CFS/STAT; Data computation: BELSPO, 2010, using Frascati definition, FPS Finance

The same upward trend is visible for the Federal authorities. The Federal Government manages more or less one quarter of the public R&D credits and invests heavily and increasingly in tax credits during the last years. Since the introduction of R&D tax credits, the GBAORD data do not give a full picture of the contribution of Belgian authorities and more specifically the Federal Government to R&D funding. The FPS Finance estimates the revenues foregone in 2009 (due to the R&D-tax credits) as €470m. This would nearly double the share of the Federal Government in public R&D funding.

12. In this report, official budgetary data for R&D used is from the CFS/STAT group and computed by BELSPO. This data is prepared on the basis of common definitions following OECD (Frascati manual) and measurement conventions agreed by all Belgian authorities. The definition is used for all parts of Belgium and is internationally comparable. As an exception to this rule, it can happen that more detailed data, not available from the CFS/STAT group, are needed to present a description of policy instruments. In such cases, non-harmonised data collected and published by the various authorities may be used.
13. 2008 is the last year for which definitive budgetary figure are available.

When total public funding in Belgium of R&D (GBAORD plus tax credits) is considered, the Flemish Government contribute 41% in 2009. The Federal Government was responsible for 35%, and this share is expected to increase in the coming years. The Walloon Region and the French Community account for slightly over a fifth of the public R&D budgets; a share that has been almost constant over time. Brussels-Capital Region is a smaller player in terms of public R&D budgets as its industrial research often takes place in its hinterland.

FIGURE 6 Share of public funding for R&D (GBAORD and tax credits) by Belgian authority, 2009



Source: CFS/STAT; Data computation: BELSPO, 2010, using Frascati definition. FPS Finance.

GBAORD data is of course instructive when considering the ‘hard’ public R&D budgets, however, many aspects of broader innovation policy (such as funding of incubators, services to SMEs for technology transfer, etc.) are not captured in these figures. The broader innovation policy mix in Belgium has been examined in various studies in recent years¹⁴ and notably the annual report of the European Commission’s InnoPolicy TrendChart platform. The 2009 Trendchart report for Belgium¹⁵ highlighted that, in June 2009, there were 78 identifiable policy measures, across all the authorities, in favour of STI in Belgium, representing an approximate budget of over €1 billion per year. This amount does not include the tax breaks nor the basic funding of research in universities or strategic research centres, etc., suggesting that total spend on broad-based STI policy in Belgium could be in the order of €2 billion per annum.

14. See for instance: http://ec.europa.eu/invest-in-research/pdf/download_en/omc_be_review_report.pdf

15. See: <http://www.proinno-europe.eu/page/innovation-and-innovation-policy-belgium>

BOX 2 Fiscal measures in favour of R&D activities

The most important measure during recent years of the federal government in support of R&D was the so-called 'partial exemption of the advance tax payment on salaries of researchers'. Taxes due by researchers are considered paid, but the money remains in the institution and is as such an extra for the institution to invest in research.

This measure builds on a recommendation of the Federal Council for Science Policy (FCSP), published in 2000, on the fiscal and social status of university researchers and assistants. It stated that research assistants (working in higher education institutes and more specifically in supporting those teaching assignments or responsibilities in labs) should not spend more than half of their time on these assignments as they are supposed to spend the other half of their time on scientific research or on their own education.

As a consequence the FCSP considered that the part of the job devoted to education, per se, should

be exempted of taxes for the universities; resulting in an important additional budgetary support for the universities. The same recommendation stated that the extra money (from this tax scheme) could be used to hire additional researchers or to increase the wages of the researchers. However, there is no obligation for the employers to do so.

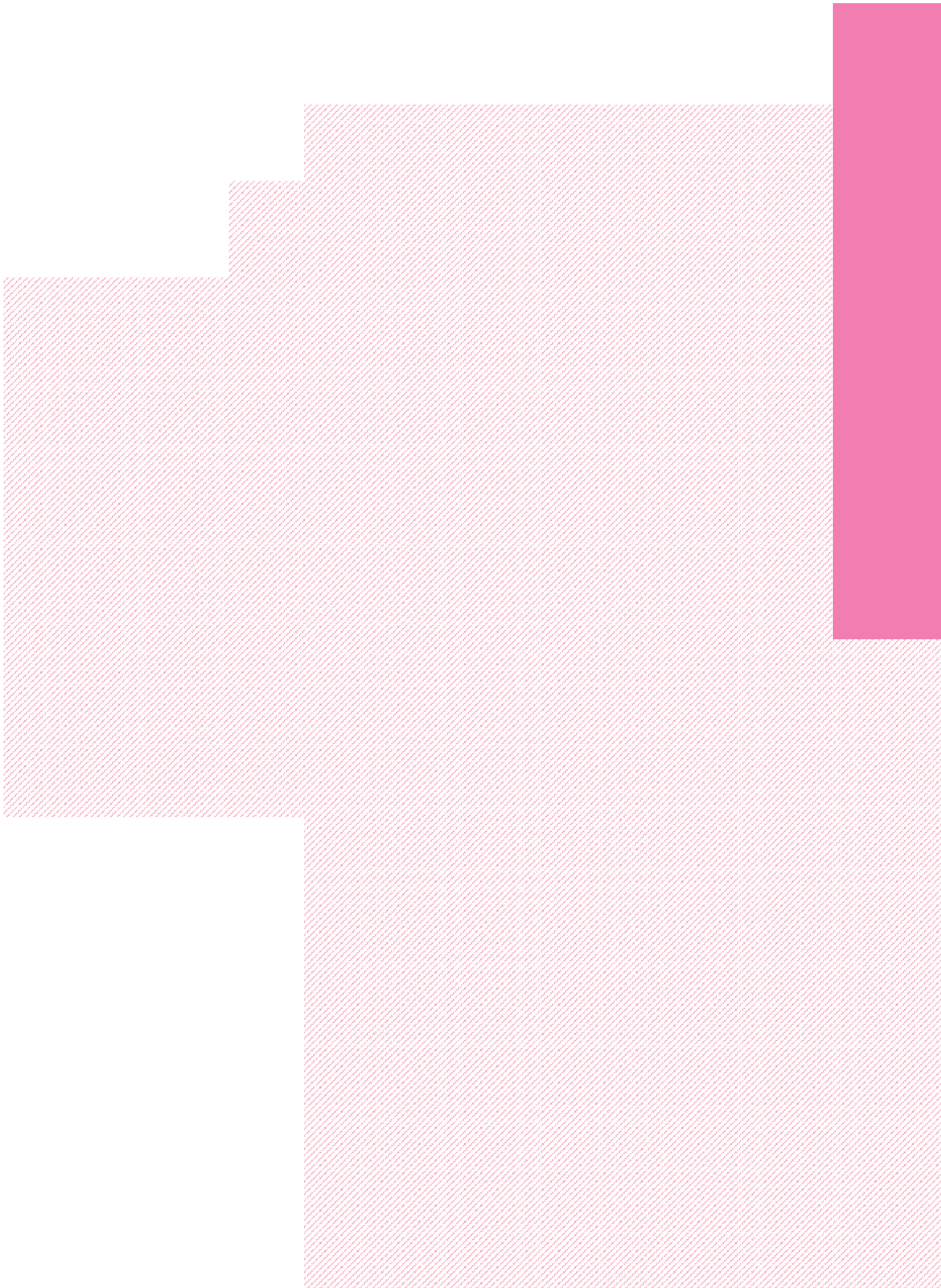
This recommendation was made law as Article 385 of the programme act of 24 December 2002. From 1 October 2003, universities, other HEIs, research funds as well as the scientific institutes (such as the 10 Federal scientific institutes under the competence of BELSPO) were able to retain 50% of the advance payment of taxes of assistant researchers or postdoctoral researchers.

The original recommendation of the FCSP was expanded to other institutions like the (officially recognised) scientific institutes and research foundations and to other categories of scientific personnel. Besides the university

assistants preparing a PhD, other categories of research personnel benefited as well from the tax scheme (doctoral assistants, 'first assistants', and similar categories).

Starting from the 1 October 2005, the measure was introduced in the private sector. First for researchers in firms collaborating with universities, other HEI or recognised research institutes, which were able to exempt the advance payment of 50% from the wage taxes of the researchers working in these partnerships. Later, all researchers employed in the business enterprise sector became eligible, conditional upon holding a specific qualification.

Gradually this measure was expanded in scope as well as in terms of the percentage of tax eligible for exemption from payment of the advance taxes. From 1 January 2009, 75% of the taxes are exempted and all categories of researchers with a masters degree or above and working in either the public or the private sector can benefit.





2.
**FEDERAL GOVERNMENT POLICY
IN FAVOUR OF SCIENCE,
TECHNOLOGY AND INNOVATION**

2.1

Objectives of the federal science policy

The Federal Government is entitled to support scientific and research activities and can thus develop its own strategy and instruments for science policy in its fields of responsibility granted by law. Indeed, at federal level, science policy is an important department both in terms of its missions as well as by the number of people employed directly or indirectly through the funding programmes supported. With a budget in excess of half a billion euro (in GBAORD terms) and more than 5000¹⁶ people employed, the federal authorities fund a number of specific programmes and institutions although a majority of the federal R&D budget is allocated for participation in international scientific and industrial research initiatives (European Space Agency (ESA), Airbus, etc.) and, hence, contributes to reinforcing Belgium's position in the ERA.

Over the last decade, the main driving forces of the federal science policy have been threefold. Firstly, the pursuit of the federal science policy, per se, based on the implementation of its research programmes (notably in the field of climate and sustainable development), supporting research infrastructures of national interest, and through a small number of 'flagship' initiatives including the pursuit of Belgian space policy, 'sustainable' nuclear energy (the MYRHHA project) and polar research with the building of the Antarctic station.

Secondly, the federal science policy aims to mobilise the entire range of instruments, present at the federal levels in support of the STI policies of all the Belgian authorities. This includes, notably, fiscal instruments (tax credits in favour of public and private R&D), scientific visas, etc.

Thirdly, the federal authorities seek to support the integration of Belgian scientists in the ERA and thereby contribute to the Ljubljana process and the Lisbon Agenda (and in the future the Europe 2020 strategy).

For all strands of action, the federal authorities co-operate, or as a recent report termed it, orchestrate policy¹⁷, with the other Belgian authorities to ensure that the interests of all actors in the Belgian research and innovation system are taken into account (e.g. in the field of space research or tax measures); and that Belgium's contribution to meeting EU objectives related to STI is made in a concerted manner.

16. 2800 at Belspo, around 650 at SCK-CEN Mol, around 500 at the institute for Public Health, etc.

17. See OMC Policy Mix Review Report (2007).

The Federal Government's science policy seeks to strengthen and promote the Belgian research potential at national and international levels, to foster scientific co-operation between the universities and research centres of the north and south of the country, to support the development of Belgian research in fields such as space and aeronautics; and to promote centres of expertise and Belgium's outstanding scientific heritage and collections at international level¹⁸.

The share of the Federal Government in Belgian GBAORD stood at just over 25% in 2008 (without tax breaks) and, in absolute terms (at current prices) the federal contribution to R&D has strongly increased over the last 10 years, see **FIGURE 7**. This is reinforced by the contribution of the Federal tax measures. Indeed, in 2010, despite the difficult economic context, the federal budget for science policy has been further reinforced¹⁹, reflecting the effort made in 2009 to consolidate and maintain the commitment to supporting R&D.

FIGURE 7 Evolution of budgetary credits for R&D policy of the federal government, 1998-2008, in €m



Source: CFS/STAT; Data computation: BELSPO, 2010, follows the Frascati definition.

FIGURE 8 provides the detail of all federal public R&D credits, covering programmes under the responsibility of all federal public services (excluding tax credits for R&D). Around 57% of the federal R&D budget is devoted to programmes with an international character (43% of the budget goes to the space policy, and 14% to the participation in international research organisations and programmes).

18. General Policy Note of the Minister for SMEs, self-employed, agriculture and science policy. As presented to the Lower Chamber of the Belgium Parliament, 4th session of the 52nd parliamentary term, 17 November 2009.

19. General Policy note of 17 November 2009 (ibid.)

FIGURE 8 Budget detail for federal science policy in Belgium, 2008

ACTION LINES	BUDGET 2008	SHARE IN TOTAL BUDGET
INTERNATIONAL R&D FUNDING		
Space research	€257.2m	43.4%
Other international research (including research infrastructures)	€82.8m	14.0%
NATIONAL R&D		
Federal scientific institutions and research organisations	€117.6m	19.8%
Research programmes and research grants (including €31.6m for the IUAP)	€100.1m	16.9%
Other federal actions	€35.3m	5.9%
ALL ACTION LINES	€593m	100%

Source: CFS/STAT; Data computation: BELSPO, 2010. Follows the Frascati definition.

The objectives and further details of these programmes are provided in section 2.3.

2.2

Actors and instruments of the federal STI policy

The Council of Ministers of the Federal Government is the executive body responsible for the major orientations of STI policy at federal level. The Federal Council for Science Policy advises the Federal Government and policy is co-ordinated by the Federal Minister responsible for science policy. Other ministers of the Federal Government deal with research matters within their own areas of competence. The Federal Interministerial Commission for Scientific Policy (CIPS-ICWB) co-ordinates the preparation and execution of government decisions on federal science policy for which mutually agreed action by several ministerial departments is required.

The Belgian Federal Science Policy Office (BELSPO) is responsible for managing federal science policy, under the authority of the Minister responsible for science policy. It prepares and implements programmes actions, autonomously, in the framework of co-operation agreements with the region or communities, or in the context of European and international co-operation.

Other federal public services (FPS) with research budgets are FPS Economy; FPS Foreign Affairs, Foreign Trade and Development Cooperation; the Ministry of Defence, FPS Public Health and Environment, FPS Social Security, FPS Home Affairs, the Federal Police, FPS Employment, Labour and Social Dialogue, FPS Mobility and FPS Justice (notably via the National Institute for Criminalistics and Criminology). The FPS Finance is responsible for tax credits aimed at stimulating scientific research or innovation, with an important and increasing financial weight in terms of public R&D budgets.

2.2.1

Federal Council for Science Policy (FCSP)

The FCSP²⁰ advises the Federal Government on the design and focus of science policy. It is composed of 33 members representing scientific, economic and social actors. The Federal Minister for science appoints 16 of its members while the others are nominated by the federated authorities as follows: seven by the Flemish government; four by the French Community government; three by the Walloon government, two by the Government of Brussels-Capital and one by the Government of the German-speaking Community. Its secretariat is managed by BELSPO. The tasks of the FCSP are, as set out in a Royal Decree (August 1997), to give advice on:

- scientific research in line with the federal competences, or in execution of international or supranational agreements,
- the creation of networks of data exchange, on a national or international basis,
- space research in the context of international or supranational co-operation agreements,
- the federal scientific and cultural institutions, their missions and research activities.

The council can react to a specific request from the Federal Government, but also upon a request from a federated authority. The opinions or recommendations formulated by the council always examine an issue from the perspective of its impact on science across the country.

The Federal Government has the obligation to ask a prior opinion from the FCSP in the following case: if it wishes to develop structures or funding schemes for scientific research that impinge on the competences of the communities or of the regions, but that go beyond their respective interests. The same holds if these structures or funding schemes pertain to international or supranational agreements that will be binding on all Belgian public authorities.

20. <http://www.belspo.be/council>

Since 2008, and the beginning of the current federal parliamentary term, the Council has submitted to the Federal Government a memorandum outlining a number of suggestions for the federal science policy; an opinion concerning the MYRRHA project²¹ of the Belgian Nuclear Research Centre (SCK-CEN)²², an opinion on the protection of laboratory animals and an opinion on the federal priorities concerning the European Strategy Forum on Research Infrastructures (ESFRI); and a recommendation on the Belgian system of fiscal incentives for R&D.

2.2.2

Belgian Federal Science policy Office (BELSPO)

BELSPO is the federal administration in charge of Science Policy and it is the main actor at this level. It has an annual budget of, approximately, €550m and close to 3000 members of staff. The activities of BELSPO are structured in four main action lines:

1. BELSPO funds research carried out at universities, research centres and federal scientific institutions.
2. BELSPO undertakes scientific research in a number of fields (space, climate, biodiversity, art history, ethnology, geology, archival science, library science) through its scientific institutions.
3. BELSPO coordinates research activities at an international and inter-federal level.
4. BELSPO manages and studies an exceptional scientific and cultural heritage, of an estimated value of €6.5 billion.

Operationally, BELSPO is structured in 12 directorate-generals (DG): 10 scientific institutions, a DG for co-ordination and scientific information and a DG responsible for programming for research and aerospace.

BELSPO manages research programmes ranging from national networks for basic research (Inter-university attraction poles) to thematic research in the fields of climate, notably at the Antarctic research base, biodiversity, sustainable development and social science and humanities.

BELSPO also manages an information technology network (BELNET) of considerable potential and adjusted to European standards through which it acts as the Internet service providers for all Belgian higher education and research institutions.

BELSPO fulfils a mission related to management and diffusion of scientific and technological information via a highly specialised service. BELSPO also plays a

21. <http://myrrha.sckcen.be>

22. <http://sckcen.be>

key role in the coordination of scientific activities between the various federated entities. This concerns, notably, the management of multi-annual research programmes requiring a co-operation agreement between the Federal and regional governments. At international level, the co-ordination role concerns close working relations maintained with the European Commission, UNESCO, the OECD, etc.

Via its' budgets, BELSPO also finances Belgian participation in large research infrastructures at European or international levels. More importantly, BELSPO manages Belgium's participation in the ESA with an annual budget in the range of €150m. This significant contribution gives BELSPO the possibility to pursue a 'technology-driven' industrial policy since the ESA investment generates a funding stream for projects of Belgian enterprises. In a similar vein, BELSPO funds R&D activities in the aeronautic sector, through a system of reimbursable loans, in particular in the framework of the Airbus programmes.

Since 1 April 2010, BELSPO has opened an Antarctic research base (Princess Elisabeth Station) financed by a public-private partnership for a total of €25m and offering to Belgian researchers that have been awarded grants through the federal research programmes to carry out their research in situ, in the polar region.

Last, but not least, BELSPO has 10 scientific institutions, which are at one and the same time high-level research centres in various fields of art and science and hosts of an exceptional scientific heritage of international quality. The institutions carry out research on their collections and make them available to a wider public through the exhibitions and other activities in their museums. Notable federal scientific institutions include the Royal Meteorological Institute, the Magritte Museum, the Royal Library or the Royal Museum of Central Africa.

2.2.3

Other Federal public services

After BELSPO, the most important federal contribution to STI policy is the federal R&D tax measures managed by the FPS Finance. An increasingly extensive set of tax breaks has been introduced over the last decade to encourage companies or research institutes to undertake (more) R&D and innovation (see **BOX 2**). **FIGURE 9** gives an estimate of the tax revenues foregone (hence, the negative number) between 2007 and 2009 by the Belgian treasury. These sums are considered revenues for the research institutes or companies and can be invested in R&D projects. In this way, the measure contributes to the attainment of the 3% Barcelona target (R&D intensity as % of GDP).

FIGURE 9 Funding of R&D through tax measures (tax revenue foregone in €)

TAX CODE	TARGET GROUP	2007	2008	2009 (ESTIMATES)
ART. 275-3, §1 1ST ALINEA	Universities, higher education institutes and research funds	- 84,553,649	-96 348 115	-140 749 832
ART. 275-3, §1, 2ND ALINEA	Officially recognised research institutes	-24 856 856	-35 519 014	-59 798 285
ART. 257-3, §1, ALINEA 3, 1°	Collaboration firms/non-profit	-16 076 904	-20 135 236	-27 579 757
ART. 275-3, §1, ALINEA 3, 2°	Young Innovative Company	-5 379 178	-7 813 658	-13 176 757
ART. 275-3, §2, 1°	Staff of private enterprises: PhD, engineers, medical doctors, etc.	-34 966 829	-75 768 261	-122 454 905
ART. 275-3, §2, 2°	Research staff in public or private sector with a Masters	-11 560 426	-48 932 624	-105 400 765
	TOTAL	-177 393 844	-284 516 906	-469 160 051

Source: FPS Finance

As noted above, other FPS²³ are active, often in co-operation with BELSPO, in funding specific research actions, or taking action to ensure an improved legislative environment for research and innovation (e.g. for IPR). In addition, certain FPS are responsible for specific federal scientific institutions (see FIGURE 15). While the budgets for specific research actions of other individual FPS are not particularly significant, these actions can be important, in their policy field, for strengthening the scientific evidence base for federal policy (see also section 2.3.2). The share of BELSPO in the total federal GBAORD rose from 67.65% in 2005 to 74.36% in 2008 due to a significant rise in the BELSPO absolute expenditure (from €313m to €441m) while the absolute expenditure of other FPS on R&D has basically remained unchanged. After BELSPO, the most significant federal departmental R&D budgets are: FPS Economy (10.5% of federal GBAORD in 2008, or €63m), FPS Foreign Affairs (7.11%, €42m), Ministry of Defence (3.61%, €21.3m) and FPS Health (3%, €18m). In overall terms, the Federal Government's investment in favour of R&D (budgetary credits and tax credits) was in the order of €1 billion in 2009.

The FPS Economy is active in support of the implementation of the Lisbon Strategy actions in favour of innovation, through three specific actions:

- The development of a demand driven innovation policy. As the scope innovation policy is much wider than the subsidies for public or private, the FPS Economy intervenes, in its fields of competence to foster demand for innovation through actions in the fields of standardisation, intellectual property, a one-off innovation bonus subsidy, regulations and legislation, green innovation and diffusion of information. This is done in consultation with the main business sectors.

23. Links to the specific websites of these FPS can be found at: http://www.belgium.be/en/about_belgium/government/federal_authorities/federal_and_planning_public_services

- Boosting markets by improved and adequate legislation and regulations, notably through the work of a round table on the evaluation and modernisation of economic laws, which exams a series of regulatory decisions, with a priority given to innovation. Subjects considered include better regulation, technological neutrality, administrative simplification, improved balance in IPR law, reinforcing e-commerce and procurement, etc.
- Placing the FPS at the forefront of new technology and the knowledge economy by supporting and promoting intellectual property rights and protection (see **BOX 3**) and quality standards and policies.

BOX 3 Federal policy and support for intellectual property

Support for improved management of intellectual property rights (IPR) is a key, non-financial, policy instrument used to strengthen the knowledge economy in Belgium. The Service for Intellectual Property (Dienst voor de intellectuele Eigendom (DIE)/ Office belge de la Propriété intellectuelle (OPRI)) of the FPS Economy is responsible for co-ordinating legislation and disseminating information on IPR.

Between 2000 and 2010, the legislative framework for IPR has been adjusted and brought up to date and a number of issues reviewed in-depth. A first priority has been the fight against counterfeiting; secondly, the Parliament adopted on 28 April 2005, a law modifying the law of 28 March 1984 on patents for inventions, thereby transposing the EU Directive 98/44/CE concerning legal protection for biotechnology inventions. Moreover, Belgium ratified the Benelux Convention on intellectual property (trademarks, designs and models), signed in the Hague on 25 February 2005.

The revision of patent law aims to increase, through an adjustment to

patenting costs, the accessibility of the Belgian patent system to inventors and firms, notably SMEs. Two specific measures entered into force on 1 January 2008: a decrease of the tax on patent applications, covering the cost of a search for prior applications and an opinion, from 887 to 300 euro. In order to finance the reduction of costs at the application stage, the annual maintenance fee for patents was increased. This adjustment of the cost of prior patent search and the increase in maintenance fees should shift the cost of funding the patent system to the holders of commercially exploited patents, thereby stimulating a greater number of applications.

From 1998 onwards, the DIE-OPRI has developed a unit for patent research which performs, on a request of inventors or firms, a search in patent or other scientific databases of the European Patent Office (EPO) or in commercial databases in order to provide information on patentability, possibilities of use, etc. During 2000-2005, the DIE-OPRI coordinated the establishment of the PATLIB network in Belgium. PATLIB provides access to a

network of centres on patent information across Europe and was set up by the national patent services of the Member States of the EPO. The objective is to improve access to patent information for all types of users, in particular SMEs and researchers, by disseminating information through brochures, specific instruments, seminars, etc. The Belgian PATLIB network consists of eight centres: five at universities and three located at collective research centres.

The DIE-OPRI grants since 2003 access through the internet to many patent databases (Espacenet-BE, the Belgian patent register and EPATRAS). Bibliographic and technical information can be obtained and, thereby, infringements of patent rights can be avoided as well as unnecessary investments in research on already existing technologies. It also facilitates the search for details on possible business partners as well as licensees. More information on the DIE-OPRI and its missions can be found at: www.economie.fgov.be/nl/ondernemingen/Intellectuele_Eigendom/index.jsp

The Ministry of Defence (MoD) conducts research activities necessary for meeting its responsibilities, including implementing international and supranational agreements. The MoD pursues three strategic objectives for R&D:

- Optimising academic education at the Royal Military Academy (the MoD's HEI at federal level) and maintaining its accreditation;
- Support to operational fields:
 - Availability of existing systems
 - Availability of future systems
 - Protection against classical threats
 - Protection against new threats
- Support to decision-making;
 - Developing a long term vision on security
 - Research related to issues and developments within the MoD
 - Research related to issues and developments outside of the MoD.

These strategic objectives are focused on the development of new national and international defence plans. The first line of development is an emphasis on the capability to engage troops in peace and security operations reducing risks to a minimum, and if possible to exclude them. Security of personnel is a high priority, both in terms of the military in the field and their family at home.

The backbone of MoD research is the medium-term programme for Science and Technology Research of Defence (STRD) which is allocated an annual budget of €5.4 million (see also **BOX 9**). It includes studies that are conducted in the framework of the R&D Directorate of the European Defence Agency (EDA) and within NATO's organisation for research and technology. The STRD programme concerns nearly 100 studies and employs a similar number of researchers. The projects are submitted by the research poles of the MoD and by the staff of the MoD themselves. Some studies are conducted outside of the poles and may involve Belgian universities. This applies mainly to decision-making support related to domains that the MoD presently does not cover. The MoD aims to internalise this research expertise in the near future.

The Royal Army and Military Museum, in addition to its mission to preserve military heritage, is responsible for carrying out important historical research.

2.3

Implementation of Federal science policy

Federal science policy is implemented, mainly, by BELSPO, through three main types of intervention: funding of international and national R&D activities carried out by Belgian researchers; support actions for science policy; and performing research carried out in the Federal Scientific Institutions

1. Financing of R&D activities:

- The Federal space research programme, in the framework of international research agreements (notably ESA);
- Participation of the country in other international research infrastructures, programmes and agreements;
- Specific, policy-oriented, research programmes in areas of national interest (sustainable development, biodiversity, digitalisation of scientific collections, etc.);
- The inter-university attraction poles promoting collaborative research programmes between Belgian universities in national networks;

2. Support for R&D activities and R&D policy:

- Statistical inventory of national scientific potential, development of databanks and information systems
- The electronic infrastructure of research players BELNET
- Co-ordination of actions at national and international level.

3. Performing research

- The specific research activities of the federal research establishments (space, geology, astronomy aeronomy, ethnology, biology, etc.) and other national scientific institutes; including the management of scientific and cultural heritage and collections.

In addition to the science policy directly managed by BELSPO, there are other areas of competence at federal level that are of importance for the broader support of STI activities in the country. These include intellectual property policy, tax breaks for R&D, and international mobility of researchers (e.g. scientific visas).

2.3.1

Funding Belgian participation in international research

Due to its size and the open nature of its economy and research system, Belgium has developed a strategy of intense participation in international research organisations and programmes. This takes place in two forms: direct involvement through the co-financing of R&D activities; and co-ordination and participation in various committees. The federal authorities are heavily involved in such international activities (regions and communities are also entitled to act on the international stage).

Resources allocated to international R&D activities represent close to 60% of the science policy appropriations of BELSPO. To a large extent, these resources are concentrated on the country's participation in the programmes of the ESA and to co-funding other large international research organisations. The desire to promote the country's STI potential within an international context goes well beyond these specific actions. It is the inspiration behind all the activities of BELSPO, particularly the thematic policy support programmes and the support for basic research networks. The research activities carried out through cooperation within the EU, especially in the FP, play a preponderant role in this, from the point of view of both the resources mobilised and their political, economic and cultural significance (see below). Importance is given to the co-ordination and stimulation of Belgian participation in EUREKA (the Federal level co-ordinates while the regions fund projects) and in the COST programme (jointly with the regions and the communities).

BOX 4 Back to Belgium, international mobility of researchers

A mainstay of the Federal authorities action for many years has been special incentives to increase bilateral cooperation and researcher mobility. Since 1991, this has been done in the framework of bilateral agreements and through the granting by BELSPO of post-doc fellowships (for 12 months) to non-EU researchers. Originally, the programme was open to researchers from the countries of central and Easter Europe, caught in the turmoil after the fall of the Berlin Wall. As these countries have now largely integrated the EU,

the aim is now broader and linked to the internationalisation of Belgium research. The list of countries now comprises Latin American and Caribbean, African and Asian countries and, in 2010, China and India were added to the list. Since 1991, the measure has awarded 673 fellowships.

More recently, a second programme of return grants for researchers abroad, or 'Back to Belgium', has been launched. The grants awarded aim to promote the reintegration of highly qualified Belgian researchers who have been working at least two

years in foreign country. Such PhD holders can obtain a 24-month grant to integrate a renowned Belgian research team (either in a university or in a research institution). The aim is to encourage the researcher to settle permanently in Belgium for the rest of his/her career. To date, 100 grants have been awarded and 98 researchers have returned and are carrying out research in Belgium. Many have obtained tenure.

See: http://www.belspo.be/belspo/home/calls/index2_en.stm

Through bilateral cooperation programmes with some target countries (e.g. with China) and through multi-lateral cooperation programmes (e.g. with UNESCO), BELSPO enables Belgian researchers and companies to broaden the scope of research and promotes mobility of researchers. The bilateral cooperation aims to mutually enforce research excellence and contributes to tackling global societal challenges. Priority is given to multidisciplinary projects with a thematic focus that are coherent with the federal research programmes and fits within the general objective of 'science for sustainable growth'. Such cooperation, that can be thought of as contributing to the international dimension of the ERA, represents a yearly budget of €1.3m. Projects implemented within this framework may be complemented by a post-doc fellowship for an expert from the partner countries.

At a European level, BELSPO acts as the National Contact Point (NCP) for FP7²⁴ for the federal authorities (every Belgian authority has its own NCP) and places great importance on the co-ordination and stimulation of Belgian participation in the European research programmes. With 2,857 participations and 452 coordinators (323 excluding Marie Curie type actions), or respectively 4.4% and 4.8% (6.3% excluding Marie Curie actions) of the EU27 total, Belgium ranks 7th in the EU27 in terms of participation in FP (see FIGURE 10). Roughly 19% of all the EU27 contracts involve at least one Belgian participant; only the 'five big' (DE, ES, FR, IT and UK) and the Netherlands perform better. Belgian participants account for 4.6% of the funds granted to the whole of the EU27, which is a fairly positive rate of return of 1.54²⁵, the 5th best in the EU27. Belgium also has the highest rate of coordination (12%) amongst EU27 countries and assumes the role of coordinator in 20% of the consortia involving at least one Belgian partner.

When the indicators are weighted with respect to the potential resources of the country such as population and GDP, Belgium takes 8th place in terms of the number of participations and, ranks in first position, outscoring all other EU27 member states, in terms of the number of coordinators. Calculating the weighting with respect to R&D resources figures, namely GBAORD and research personnel, ranks Belgium respectively 12th and 8th in terms of participations; and third (GBAORD weighted figures) and second (R&D personnel weighted figures) amongst the EU27 for the number of coordinators.

24. <http://eurofed.stis.fgov.be>

25. Ratio of [BE funding/EU27 funding]/[BE contribution to EU budget/EU27 contribution to EU budget]

FIGURE 10 FP6 participation by theme and activity

THEME, ACTIVITY	NB OF PARTICIPATIONS		BE/	OF WHICH NB OF COORDINATIONS		BE/	EC FUNDING (THOUSAND €)		BE/
	Σ EU27	BE	Σ EU27	Σ EU27	BE	Σ EU27	Σ EU27	BE	Σ EU27
Specific measures in support of internat. coop.	1131	59	5.2%	271	17	6.3%	204358	58833	28.8%
Science and society	929	67	7.2%	154	14	9.1%	72551	6409	8.8%
Euratom	1070	87	8.1%	77	12	15.6%	172002	14826	8.6%
Citizens & governance in knowledge-based society	1712	104	6.1%	138	9	6.5%	217654	14788	6.8%
Research and innovation	1688	88	5.2%	222	15	6.8%	209306	12807	6.1%
Support for coherent develop. of R&DI policies	152	7	4.6%	19	1	5.3%	13253	780	5.9%
Nanotech. & nanosci., knowledge-based materials	5365	241	4.5%	419	21	5.0%	1433996	70045	4.9%
Policy support & anticipating scient. & techn. needs	4094	202	4.9%	495	32	6.5%	546228	26557	4.9%
Information society technologies	12864	518	4.0%	1030	68	6.6%	3506778	170263	4.9%
Life sciences, genomics and biotech. for health	6140	278	4.5%	560	41	7.3%	2154785	98270	4.6%
Aeronautics and space	3253	170	5.2%	235	23	9.8%	1019924	45941	4.5%
Food quality and safety	2711	139	5.1%	178	15	8.4%	680173	30478	4.5%
Sustainable develop., global change & ecosystems	9002	402	4.5%	639	39	6.1%	2075090	71932	3.5%
Human resources and mobility	7452	252	3.4%	4238	129	3.0%	1571195	48608	3.1%
Horizontal research activities involving SMEs	5122	138	2.7%	457	9	2.0%	450786	13359	3.0%
Research infrastructures	1543	50	3.2%	140	5	3.6%	654967	17683	2.7%
Support for the coordination of activities	1086	55	5.1%	100	2	2.0%	272238	6321	2.3%
TOTAL	65314	2857	4.4%	9372	452	4.8%	15255284	707898	4.6%

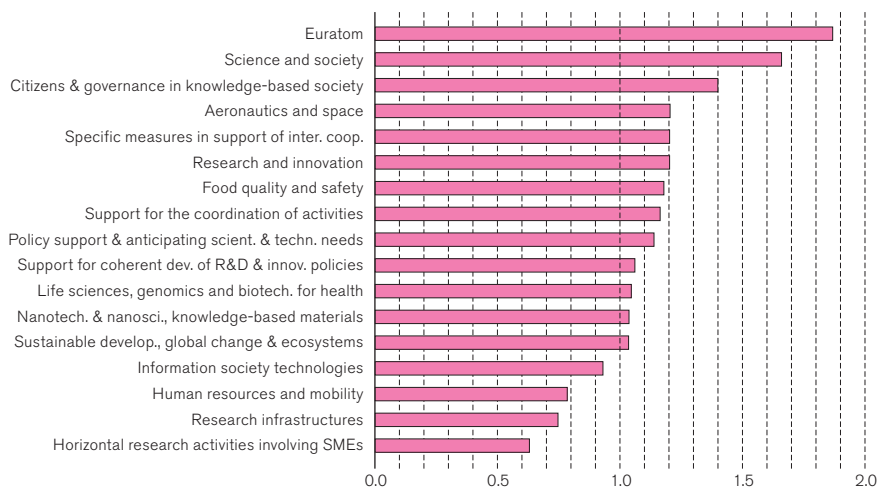
Breakdown by area of key-figures of the participation of Belgium in the FP6 (except for Euratom thermonuclear fusion projects and so called 'direct actions' of the JRC).

Source: FP6 contracts and participants database (e-Corda) — Update 6th June 2008

The value of the specialisation index for each area of the FP6 indicate that Belgian participants are by far the most active in Euratom projects (see FIGURE 11). Social sciences and the humanities follow close together. Rather surprisingly, Belgian scientists seem to have been relatively less active, but still specialised, within life sciences although this area is a traditional flagship of the Belgian R&D landscape.

Federal actors (R&D centres, scientific institutions, public administrations, etc) have in total 148 participations (5.2% of all Belgian participations) representing a total budget of €28.4m. Federal participants were notably active in the following themes of the FP6: Euratom (41 participations), ‘policy support and anticipating scientific and technological needs’ (21) and ‘aeronautics and space’ (18). Three areas account for nearly 60% of the total money allotted to the federal actors: Euratom (34%), ‘aeronautics and space’ (13%) and ‘sustainable development, global change and ecosystems’ (11%). About 25% of total FP6 funds awarded to the federal actors was allocated to ‘Life sciences, genomics and biotechnology for health’.

FIGURE 11 Thematic specialisation index of Belgium in FP6 vs EU27



Source: FP6 contracts and participants database (e-Corda) — Update 6 June 2008 Specialisation index of Belgium in the 17 themes and actions of the FP6. Values > 1 indicate those of the themes or activities within which Belgium participates in FP6 at a rate higher than average in EU27.

On the whole, the Belgian research teams are among the key-stakeholders of the FP6 and score well above the median of EU27 both in terms of participation and of coordination of R&D consortia. The figures of Belgium’s participation in the FP6 are well above what might be expected from a medium-sized country in EU27 and are in line with the performance of Europe’s leaders in R&D and innovation. However, a ‘juste retour’ analysis does not shed light on the real impact/output and a fuller evaluation of the impact of FP6/FP7 participation of Belgian researchers is required.

Further information on the participation of Flemish and Walloon researchers can be found in sections 3.3.4.1 and 4.2.2.1, respectively.

2.3.1.1

European large-scale research infrastructures

Belgium has been actively involved for more than 55 years in cooperation at European level and in intergovernmental scientific and technological organisations. By pursuing the ‘internationalisation of Belgian research’, BELSPO provides researchers the possibility to access world-class scientific facilities, unique large-scale research infrastructures, training centres and databases. It allows Belgian companies to take full advantage of the numerous industrial, technological and commercial opportunities generated by these activities. Moreover, Belgian scientists and science policy managers participate in the scientific, technical and management committees of the international organisations creating networks of contacts.

The country is a founder member of the CERN (European Laboratory for Particle Physics) in 1954 and of the ESA in the years 1964-1975. Belgium is also a founder member of the ESO (European Southern Observatory) since 1962 and of the ESRF (European Synchrotron Radiation Facility) since 1988. Belgian scientists and high-level science policy officials played a major role in the creation of each of these organisations. Belgium joined the EMBL (European Molecular Biology Laboratory) in 1989, participated to the creation of EFDA (the European Fusion Development Agreement) in 1999 and became a member of the ILL (Institut Laue-Langevin), one of the main neutron sources in the world, in 2006. Hence, the country is a member of all seven EIROforum (European Intergovernmental Research Organisations Forum) member organisations.

In 2008, Federal Government funding for European large-scale facilities amounted to approximately €46m. The level of the Belgian financial contribution in these organisations is normally linked to its GDP and ranges from 2.8% (CERN) to 3.5% (ESO) of the total contribution of the members. The contribution changes according to the legal basis and the specific budgetary rules of each organisation and is also the result, in some cases, of scientific, industrial or political choices. Hence, it is as high, for example, as 7% for ESA’s optional programmes. The expenditures for EIROforum membership are supported by the budget of BELSPO, except for CERN and EFDA the costs of which are borne by the FPS Economy. BELSPO also funds Belgium’s membership of the ECMWF (European Centre for Medium-Range Weather Forecasts), EUMETSAT (the European Organisation for the Exploitation of Meteorological Satellites) and other organisations.

2.3.1.2

The ESFRI Roadmap

The European Strategy Forum on Research Infrastructures (ESFRI) adopted in 2006, and updated in 2008, the European Roadmap on Research Infrastructure, which identifies 44 priority projects for the ERA in the next 10 to 20 years. The FCSP adopted in December 2009 a series of recommendations on the participation of the Federal Authority to 10 projects of the roadmap, including projects led by the EIROforum members, and infrastructures in the fields of social sciences and humanities, biological and medical sciences, including biobanks and bioimaging, and environmental sciences, including biodiversity. This participation will have to be coordinated with the federated entities; they involve several Federal Scientific Institutions and will require the financial support of BELSPO and possibly of other federal departments too. BELSPO already supports the contribution of Belgium to the upgrade programmes of the ESRF and the ILL and has expressed its interest for a limited number of preparatory phase projects funded by the EU FP7. The Belgian Nuclear Research Centre participates in the Jules Horowitz Reactor.

2.3.1.3

Belgian Space Policy

The Federal space research programme has been a long-standing priority for successive federal governments. Its direction is determined by the participation of Belgium in the ESA, which allows Belgian researchers from universities and industry to take part in joint scientific activities at international level. This policy aims not only at reinforcing the knowledge base in this area, but also at promoting industrial spill-overs in the form of applications of space technology to other industrial sectors. Belgium is the sixth most important contributor to ESA, providing a budget of more or less €150m per year. The overall investment of BELSPO in space policy is about €200m (including ESA and bilateral co-operation). Thanks to the important Federal investment in the space field, Belgium has been able to send two astronauts into space: Dirk Frimout and Frank De Winne. The latter was the first European commander of the International Space Station.

BOX 5 Federal space research policy

Belgium has been involved in space policy since the 1960s and from the beginning decided to back up the efforts by its scientists and companies working in space research and space applications by opting for integration into a European framework in order to optimise its financial investment. The management of Belgium's participation in European space

programmes has been entrusted to the Federal government. In particular, Belgium has:

- played a major role in the creation of the ESA by the European Ministerial Space Conference in Brussels in 1973;
- entered into bilateral cooperation in the space field: with France (for the Earth

observation programme SPOT), with Russia in MIRAS and SPICAM and with Argentina.

The rationale for space research programmes includes offering Belgian scientists the opportunity of observation and experimenting in orbit in order to broaden the scope of their research. This enables them to participate in the

design of complex instruments and helps companies to diversify into space markets, firstly by becoming involved in the creation of orbital infrastructures and means for access to space and then, more recently, in the development of space applications (such as in telecommunications) and the services related to these applications.

Through research funding related to the exploration of space the federal authorities pursue the following objectives:

- Scientific objective: space is an advantageous point from which to observe the Earth and the Universe, and the weightlessness in space is useful for experiments within a whole series of scientific disciplines. It therefore allows considerable progress to be made in human knowledge;
- Public objective: space allows global monitoring of the environment and a considerable extension of general-interest services such as meteorology, telecommunications, prevention of natural risks, harvest monitoring and navigational aids for land, sea and air transport;

- Industrial objective: space offers industries an opportunity to develop the most advanced technologies in a wide range of fields (electronics, computers, automatic systems, materials, aerodynamics, etc.) and to initiate themselves in the integrated management of complex systems. The skills acquired in these fields can then often be transposed to non-space applications;
- Commercial objective: space has become a market, now a rapidly expanding one. Its products – launchers, satellites, ground equipment, satellite pictures, telecommunications, broadcasting and multimedia services – generate significant sales.

Nearly 95% of the federal budget for space is allocated to ESA programmes. The other 5% goes to the Belgian Observing the Earth programme and bilateral programmes. PRODEX is the largest ESA programme supporting space research in Belgium. In 2008, 91 scientists were involved in these projects and 74 projects/topics were supported in Belgium,

representing almost 60% of all projects of all the six participating countries and 65% of the total number of scientists involved.

The space sector in Belgium involves some 70 teams in federal or regional scientific establishments or research centres of excellence, as well as around 40 companies and almost 1,600 direct jobs for highly qualified people. For some of the companies, this space orientation represents all or a large part of their turnover. For others, it constitutes an opportunity to become familiar with advanced generic technologies common to the space and non-space sectors. Furthermore, various Belgian centres are performing testing, calibration or inspection activities for the ESA. This is the case for the Liège Space Centre (CSL) for precision tests under vacuum conditions, the Von Karman Institute in Rhode-Saint-Genèse (plasmatron) for studying the re-entry of spacecraft into the atmosphere, the Cyclotron Research Centre in Louvain-la-Neuve, which studies the effects of cosmic radiation on electronic components.

Source: www.belspo.be

2.3.2

Federal research programmes

At national level, the Federal Government supports STI activities mainly through two types of effort: support to federal scientific institutions, and specific research programmes of national interest. The BELSPO research programmes have two main purposes:

- Support to basic research: the Inter-University Attraction Poles (IUAP) programme, a collaborative research programme fostering collaboration across Belgian universities from the two communities (see **BOX 6**).

- Support to strategic research: thematic programmes devoted to the implementation of research projects in areas of national interest, in line with the federal government's priorities.

BOX 6 Inter-University Attraction Poles

For more than 20 years, BELSPO has supported basic research through the IUAP. The programme aims to reinforce high-level scientific potential of universities and to give a temporary impetus to the formation of interuniversity networks of excellence in basic research. The IUAP is open to all scientific disciplines and covers a wide range of research fields including life sciences, exact and applied sciences and human sciences.

The impact of the IUAP on basic research is considerable as shown by the number of 'peer-reviewed' scientific publications in top journals. The IUAP programme also represents a critical mass of several thousands of researchers working in the framework of the programme including some 500 researchers paid by IUAP funds.

Another way to assess the impact of the IUAP is to look at the international recognition gained by participating teams. Scientific collaboration, as implemented through the IUAP, puts Belgian researchers into a favourable position in international science networks and makes it possible for the best national research teams to be part of the avant-garde at world level.

What makes the IUAP one of the most significant incentives for basic research in Belgium is not

only the size of the financial commitment but also the emphasis placed on interuniversity collaboration. The programme's objectives are multiple:

- to give teams that are already recognised within the international scientific community additional human and material resources to build a sufficient critical mass;
- to promote long-term, structured collaboration among university research teams of both Belgium's linguistic Communities and teams belonging to the federal scientific institutions;
- to foster complementary and interdisciplinary research amongst the teams;
- to enable young teams to benefit from the environment of excellence provided by a network and its international renown and influence;
- to facilitate the insertion of Belgian research teams into European and International networks.

The IUAP programme was first launched by the federal authorities in 1987 and has developed over six 5-year periods. Today the IUAP networks have become a hallmark of excellence on the Belgian science policy scene. The sixth phase (2007-2011) includes 44 networks and involves 324 teams (including 74 non-Belgian European teams).

The IUAP represents a unique structure in which French- and Dutch-speaking scientists from Belgium's different Communities have the opportunity to work together. This is why the initiator of these networks is the Federal Government, whereas all other components of basic research funding in our country are entrusted to the Communities.

For the first five phases of the IUAP programme, the BELSPO invested some €370m in basic research over the period 1987-2006. Funding of the sixth phase of the IUAP programme will total about €143m for the period 2007-2011. Moreover, 3% of the budget has been set aside for the participation of teams belonging to non-Belgian universities or public research institutions within the EU. The opening of the IUAP programme to institutions in other European countries is a step towards integration of the Belgian scientific potential into the ERA. The IUAP has undergone repeated evaluations by international experts. From these assessments it emerged that the IUAP programme has amply met expectations as regards progress towards its objectives and that it constitutes an important science policy instrument.

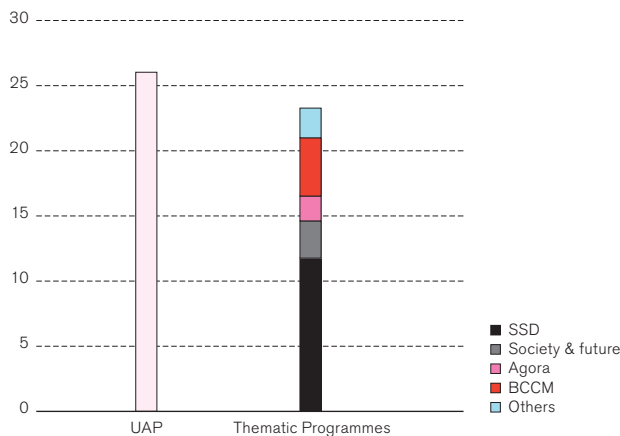
See: http://www.belspo.be/belspo/iap/index_en.stm

BELSPO funds thematic research programmes on issues of importance to society. By nature, such issues are not confined within defined administrative borders. The rationale for implementing such research programmes is to support policy-making: the topics selected constitute horizontal priorities of the Federal Government. These programmes have an average duration of four years.

The approach chosen for the thematic research programmes is as follows:

- Research themes are defined in an international framework, allowing Belgian research teams to take part in international research programmes;
- The research is organised in networks of researchers from various disciplines and institutions, and also includes other players (administrations, enterprises, etc.);
- Specific attention is paid to the creation, exploitation and dissemination of suitable data in support of decision-making;
- Policy makers and stakeholders are involved in the follow-up of the research in order to foster the transfer of results to the policy sphere;
- Dissemination and exploitation of research results are given specific attention at the design stage of the research;
- The growing importance given to evaluation, both at project and at programme level. All the projects are evaluated by international experts, ex-ante as well as ex-post, and even more frequently at mid-term.

FIGURE 12 Federal research programmes: indicative annual funding (2005-2010, million euro)



A trend of the last 10 years has been a grouping of research funding in a limited number of programmes to encourage trans-sectoral analysis and interdisciplinary research. The main current thematic federal research programmes are:

- Science for sustainable development (2006-2012, €61m): the aim of this research programme is to clarify the concept of sustainable development, and study its practical implications in support of policy making including in the field of global warming (see **BOX 7**).
- Society and Future (2005-2010, €14.6m): The programme builds on a long tradition of research programmes in social sciences (namely Prospective socio-economic research from 1995 to 2000 and Social cohesion from 2000 to 2005) and aims at reinforcing the Belgian scientific potential in social sciences and at providing scientific evidence to support the decision making processes of the Federal Government. In comparison to previous programmes, Society and Future focuses on new themes, opens the possibility to finance foreign researchers, explicitly embeds the gender dimension within projects, and seeks to promote internationalisation (e.g. international seminars).
- The AGORA programme (about €2m per year) with a view to reinforcing and structuring social science and administrative databases, as a form of 'research infrastructure'. The projects fund either research teams or federal departments with the aim of building, consolidating and disseminating a quality social science infrastructure. Projects can be submitted either by other federal administrations (in which case they have to commit to making the databases open for access for researchers) or by social science research teams.

Another important action worth highlighting is the federal commitment to consolidate the Biological Resource Centre (BRC) through an annual recurring budget of €5m for two initiatives: the Belgium bio-diversity platform²⁶ and the Belgian Co-ordinated Collections of Micro-organisms (BCCM)²⁷. The BCCM™ consortium consists of four complementary research-based service culture collections and three specialised nodes that are coordinated by a central team at BELSPO. BCCM holds biomedical fungi & yeasts, (agro) industrial fungi & yeasts, plasmids & DNA libraries, bacteria, archaea, mycobacteria, cyanobacteria and diatoms. To support knowledge based bio-economy BCCM™ is certified ISO 9001 for the accession, control, preservation, storage and supply of biological material and related information in the frame of public, safe and patent deposits.

26. <http://www.biodiversity.be>

27. <http://bccm.belspo.be/index.php>

BOX 7 Federal Programme 'Science for sustainable development'

The Federal Science Programme for Sustainable Development is a set of actions implemented to support decision making at federal level, in response to national priorities, but also to international agreements and obligations of the country (EU directives, North Sea and Antarctic Agreements, United Nations Conventions, etc.). A cooperation agreement with the regions aims at ensuring exchange of mutual information and exploitation of results between the State, in charge of the programme, and the Regions.

The programme 'Science for a Sustainable Development' covers the period 2006-2012 with a budget of €61m. This programme is the continuation of the Scientific

Support Plan for a Sustainable Development Policy (SPSD I, 1996-2001) and SPSP II (2000-2005). Compared to the previous round, the programme integrates new themes, namely 'Health and Environment' and 'Standardisation'. The programme has three objectives:

1. to clarify the concept of sustainable growth so that it can be integrated in policy making;
2. to stimulate and integrate the use of scientific data on various aspects of sustainable growth into a policy- oriented framework;
3. to foster communication and exchange of information among all players concerned.

To this aim, thematic programmes covering important dimensions of the sustainable growth concept, are implemented. They deal with global change, North Sea management, Antarctic research, sustainable mobility, and the agro-food sector. Another specific programme studies the interaction between human behaviour and natural phenomena. The programmes are inter-disciplinary, defined around a theme rather than a discipline. The research programmes are complemented with support for the use of satellite data and with the provision of an electronic exchange infrastructure for researchers, BELNET.

Amongst the other federal research actions, BELSPO supports co-ordination and networking under the umbrella of the Belgian Polar Platform²⁸ (see **BOX 8**), funds polar research projects and the Princess Elisabeth Station²⁹ (which results from a public private partnership: BELSPO, the International Polar Foundation³⁰, and private sponsors). These measures are designed to reinforce and maintain Belgium's long tradition in polar research.

BOX 8 The Belgian Polar Platform

The Belgian Polar Platform regroups all Belgian polar scientists in order to better communicate to both policy makers and the public about:

- Belgian Polar scientific activities and results
- Belgian scientific activities at the poles,
- laws and treaties regulating

polar activities and Belgium's involvement

- publications, workshops and events regarding polar activities.

In 1985 BELSPO launched the Belgian Research Programme related to Antarctic Research. The funding, management, coordination

and development of the programme are in the hands of BELSPO. An average of 20 research teams of 10 different Belgian universities and research institutes are financed (all research costs: personnel, equipment, travel, working and overheads) within the programme. Scientific liaison with the Antarctic Treaty System is also the

28. http://www.belspo.be/belspo/BePoles/index_en.stm

29. <http://www.antarcticstation.org>

30. <http://www.polarfoundation.org>

responsibility of BELSPO. Research topics and priorities are in line with major international projects and programmes. Since 2000, Belgian researchers can choose to cooperate with an international university or research institution within their project on the basis of a co-financing.

Until recently, Belgium did not have its own logistical resources (base, vessel, aircraft) in support of Antarctic research. Therefore, research fieldwork was, and for a major part still is, carried out by participation of the Belgian researchers in campaigns organised by other countries, based on the availability of vacant space on research vessels and in

bases and the recognition of Belgian expertise. Frequent sharing of facilities, even during the same campaign periods, took place over the years, leading to successful international research collaborations.

In 2008-2009, almost 40 years after the closing of the Belgian King Baudouin base, Belgium opened a new Antarctica research station in the Sør Rondane region: the Princess Elisabeth research station. The station is the first in the Antarctic to be built adopting the most modern standard of isolation and applying renewable energies, allowing it to be classified a zero-emission building. The Belgian base

is open to scientists from all other Antarctic Treaty partner countries willing to perform research activities in this area.

In the same year, BELSPO launched a Belgian scientific programme related to the station. Six research projects are currently implemented with emphasis on glaciology, earth sciences, terrestrial (micro)biology, surface weather observations, monitoring of aerosol particles and radiation components, absolute gravity and seismic measurements and continuous GPS measurements.

For more information:
http://www.belspo.be/belspo/BePoles/index_en.stm

As noted above, other federal departments also manage smaller R&D budgets in their own spheres of responsibility. Some examples are given in the following box.

BOX 9 Examples of research actions of other federal public services

Research actions of the Ministry of Defence

In order to achieve maximum effectiveness of research projects within the MoD, the policy fosters a focused approach on 10 research niche:

- C4ISTAR (Command, Control, Communications and Computers for Intelligence, Surveillance, Target Acquisition and Reconnaissance)
- Hyperspectral and TeraHertz detection
- Intelligent autonomous systems (and platforms)
- Protection of personnel, systems and facilities
- New sources of energy
- Military medicine
- Human performance

- Security environment
 - Military history.
- Within this framework, R&D is performed by 'centres of excellence':

At the Royal Military Academy

- DYNAMIC MATERIALS for SECURITY (DYMASEC). DYMASEC is a consortium of laboratories (Explosion Effects, Material Engineering, Energetic Materials and Weapon Systems & Ballistics) performing research related to the behaviour of materials and structures exposed to high dynamic loads with emphasis to security of the soldier (and the citizen), military systems (like vehicles) and military infrastructures.

- MOBILE INTELLIGENCE INFORMATION SENSORS FOR SECURITY (MOBINISS) focuses its research on Unmanned Ground-, Aerial- and Surface & Undersea Naval- Vehicles engaged in military crisis management operations and in civilian security services (fire brigades and disaster relief organizations).
- SIGNAL, SYSTEMS & SENSORS, INFORMATION & INTELLIGENCE, COMMUNICATION (SIC) performs research in the field of signal processing, data fusion, information & intelligence processing collected by various sensors (like radars, sonars and satellites) and sources (like communications, multimedia) to the benefit of the end users on

crisis management theatres but also for the National Geographic Institute (NGI) and for civilian security.

- Plasmas Physics Laboratory (LPP) is working within the frame of EURATOM to prove the technological feasibility of a full-scale thermo-energy fusion in order to produce electricity.
- European Security (SecEU)
 - Sub-pole Risk, Crisis & Disaster Management is developing techniques and methods of risk management for public organisations facing a crisis.
 - Human Factors & Military Operations research field is exploring the sociological, psychological, ethical and legal aspects linked to the rise of post-modern armed forces (internationalisation and diversification of crisis management operations and professionalisation).

As well as in the following institutions:

- The Defence Laboratories (DLD) are conducting research in the domain of biological detection of agents of bio-terrorism and of protection of personal and equipment against chemical, bacteriological, radiological and nuclear agents. DLD also hosts the Federal Orientation Laboratory (FOL): the federal crisis centre; and the crisis cell of the FPS Public Health.

- At the Central Hospital Base Queen Astrid (HCB-KA) The Centre of Burn Injuries of the HCB-KA is a European centre of excellence in the treatment of burns victims. HCB-KA is also performing research in emergency and disaster medicine, hyper-and hypobare medicine, crisis psychology, physiological health and infectious diseases.
- The Centre for Security and Defence Studies (CSDS), of the Royal High Institute for Defence (RHID), is the think tank of the MoD in the field of security and defence. CSDS performs studies with a thematic and a regional approach.
- The Military Royal Museum (MRA) maintains and organises military heritage records as part of the national historical memory. It stimulates scientific research to diffuse their archive collections and organises outreach activities to a wider audience.

Research on foreign affairs

The FPS Foreign Affairs, Foreign Trade and Development Cooperation funds research on a four main themes relevant to Belgian foreign policy priorities.

The Central Africa Programme of the EGMONT Institute conducts research on political, economic, social and security issues and developments relating to this region (Burundi, the Democratic Republic of Congo and Rwanda).

The research also examines the major trends on the African continent (African Union, regional integration, conflict analysis and post-conflict reconstruction) and the role and position of the EU in Sub-Saharan Africa.

The European Affairs Programme started in 1995. It has been in charge of drafting studies, syntheses, proposals and amendments either on its own initiative, or at the request of the FPS Foreign Affairs, as well as other FPS, in the context of European negotiations. The subjects of the studies are extremely varied. They are related to institutional affairs as well as the various policies of the Union. The programme will contribute to the Belgian presidency of the EU in 2010.

The Security & Global Governance Programme contributes to the debate on a new security concept for the multipolar world of the 21st century. In today's world, security is no longer limited to the military sphere alone. A holistic approach is required, integrating physical security, economic prosperity, political freedom and social wellbeing. The Middle East Project focuses on the strategic implications of the Sunni-Shia divide in the Muslim world. This project is funded by the BELSPO and is undertaken in cooperation with the universities of Ghent and Louvain-la-Neuve.

2.3.3

The federal scientific establishments

Belgium has 15 federal scientific establishments of diverse types and covering a variety of research activities and collections: museums, libraries, botanic gardens, weather and space observatories and research institutes on crime, African culture, geology, health institutes, etc. In total, one fifth of the federal science budget is allocated to the federal scientific establishments and other research organisations. The former are attached to various ministries and are not only responsible for performing research in specific fields of expertise, but also have a publicly orientated scientific mission. The Federal Minister for Science is responsible for 10 out of 15 of the scientific establishments which are part of BELSPO.

These scientific establishments perform a two-fold mission:

- A 'scientific public service mission': development, maintenance and dissemination of scientific, technical and cultural information and documentation, collection conservation and education in these areas. A number of initiatives are underway to equip and to modernise these establishments with high performance IT tools and systems and ensure the dissemination of available information;
- A research mission: these establishments perform fundamental and applied research missions, often in partnership with universities. They participate, and are sometimes leaders, in international research projects and exchange programmes.

The budget of these institutions grew from 2003 to 2010 by more than 30 per cent.

FIGURE 13 Funding of Federal Scientific Institutions within BELSPO (2003-2010)

YEAR	AMOUNT (IN THOUSAND €)	INDEX, 100=2003
2003	93,695	100.0
2004	96,858	103.4
2005	100,190	106.9
2009	123,549	131.9
2010	122,304	130.5

The majority of these institutions have a history stretching back more than a century and manage a very rich cultural, scientific, artistic and natural heritage. In order to reach a wider public, ensure optimum use of the information and to provide access to the collections and the research data, a process of digitalisation has started in all institutions. Since digitalisation projects for scientific and cultural heritage are very expensive they are developed in a long-term perspective and in collaboration with the private sector. A public private partnership is being set up into which the

Federal Government via BELSPO aims to invest €150m over a 10 year period. Nine pilot projects launched in the last couple of years, with a budget of around €15.1m, will generate their first results shortly.

In addition to the digitalisation projects, the institutions promote projects on societal or environmental issues. For instance, in 2010, the Royal Belgian Institute of Natural Sciences is promoting the year of biodiversity and plans exhibitions and colloquia on the issue. Moreover, the Royal Museum for Central Africa is celebrating 100 years of existence in Belgium, and research missions and events to mark the occasion are also taking place in Congo (e.g. Congo River expedition). The institutes making up the space group, are studying and researching every aspect of earth, space and the sun in order to monitor the impact on human life. The institutes are active in developing devices to be carried by satellite for experimental and observational purposes. For instance, improved earth observation leads to more accurate weather forecasts thanks to complex mathematical models.

BOX 10 Federal scientific institutions

Federal scientific institutions of BELSPO

- Belgian Institute for Space Aeronomy
- National Archives and State Archives in the Provinces, including the Centre for Historical Research and Documentation on War and Contemporary Society
- Royal Belgian Institute of Natural Sciences
- Royal Institute for Cultural Heritage
- Royal Library of Belgium
- Royal Meteorological Institute
- Royal Museum for Central Africa
- Royal Museums for Art and History
- Royal Museums of Fine Arts of Belgium
- Royal Observatory of Belgium, including the Planetarium

Federal partner institutions and other organisations subsidised by BELSPO

- Academia Belgica at Rome;
- Belgian American Educational Foundation;
- Biermans-Lapôte Foundation in Paris;
- Fulbright Commission for Educational Exchange between the USA, Belgium and Luxembourg
- Institut des Hautes Études Scientifiques;
- Royal Academy of Overseas Sciences;
- Royal Film Archive;
- Shape International School;
- University Foundation;
- Von Karman Institut.

Other federal scientific institutes reporting to other Federal Public Services

- Justice
 - National Institute of Criminalistics and Criminology
- (ex-)Agriculture
 - National Botanic Garden of Belgium
- Defence
 - Royal Army and Military History Museum
- Public health
 - Scientific Institute of Public Health
 - Veterinary and agrochemical research centre

One of the main organisational objectives of the scientific institutes, for the coming years, is to concentrate their research activities in excellence centres in order to cope better with the international competition and the challenges of the 21st century.

Since 2008, several excellence centres have been created including on research on the sun, molecular taxonomy, cartography, etc. The multiplication of synergies between the Federal scientific institutes and between those institutes and the research programmes conducted by BELSPO will represent the major development challenge of those Institutes.

BOX 11 Federal institutes in the field of human and animal health

The main mission of the Scientific Institute of Public Health (IPH) is health policy related scientific research. It provides also expertise and public service in the field of public health. The Institute has a staff of more than 500 people, one third of which are scientific personnel. The IPH plays an important role at Eca level and in some international organisations such as the World Health Organisation (WHO), the OECD and the Council of Europe, whenever scientific and/or technical aspects of public health are involved. The Institute supports education at universities within the framework of doctoral schools, by

attracting PhD students and delivering specialised training.

IPH's main activities are related to the following fields:

- Surveillance of communicable diseases
- Surveillance of non-communicable diseases
- Verification of federal product norms (e.g. food, pharmaceuticals, vaccines)
- Risk assessment (e.g. chemical products, genetically modified organisms (GMO's))
- Environment and health
- Management of biological resources (collections of strains of microorganisms)

Within the framework of sustainable and socially acceptable agriculture the Veterinary and Agrochemical Research Centre's core activities consist of policy supporting scientific research, expert advice, and the efficient provision of services concerning the control of communicable animal diseases, the protection of public health, the guarantee of animal and plant food production quality from the standpoint of zoonosis, residues and contaminants. The centre has about 220 employees (of which seven scientists).

The Federal Government also has responsibility for two other research organisations, the National Institute for Radioelements, and the Nuclear Energy Centre (budgetary R&D credits of €26m in 2008).

BOX 12 Nuclear research

The Belgian Nuclear Research Centre (SCK-CEN), created in 1952, provides the Belgian academic and industrial sectors with access to worldwide developments in nuclear energy. The centre is a private foundation of public utility placed under the authority of the Federal Minister of Energy. SCK-CEN is one of the largest research centres in Belgium with laboratories in Mol

and about 650 employees, of which one-third with an academic degree. The breakdown of the annual turnover of €95m by source is: 45% from a Government grant; 12% from the dismantling of declassified installations and 43% from contract research and services.

Since 1991, the mission of SCK-CEN is focused on issues of societal

concern within the broader scope of sustainable development policies: (i) safety of nuclear reactors and installations; (ii) radiation protection of man and the environment; (iii) safe treatment and disposal of radioactive waste and (iv) management of fissile and other strategic materials. The centre provides know-how and services to the nuclear industry, the medical sector and the government.

Among the research facilities available at SCK-CEN, the Belgian Reactor 2 (BR2) is one of the most powerful research reactors in the world. It is used for the testing of fuels and materials for different reactor types and for the European fusion programme. BR2 is also an important instrument for the production of radioisotopes for medical and industrial applications (25% of the world production in 2010) and for silicon doping for the electronics industry. The underground laboratory HADES, at a depth of 225m, allows the study of clay as a potential geological host formation for long-lived and high-active nuclear waste. Recently this laboratory has been substantially expanded in order to perform large-scale tests to demonstrate the feasibility and safety of the disposal of heat-generating nuclear waste.

From 2010 to 2020, SCK-CEN activities will encompass three major themes, namely: (i) nuclear materials sciences; (ii) environment, health and safety and (iii) advanced nuclear systems. The Institute for Nuclear Materials Science will focus its research activities on the life and performance of materials used in Generation II and III nuclear reactors. Development and validation work will also take place on new materials and fuels for future advanced reactor concepts. The Institute for Environment, Health and Safety will conduct research on the biological effects of low doses of ionizing irradiations. Solutions for safe and sustainable deep or surface disposal of

radioactive waste are being developed and evaluated with respect to safety, technical feasibility and acceptance.

In the coming decade the development of the MYRRHA project, a multi-purpose research reactor, will be the top priority of SCK-CEN, and in particular of its Institute for Advanced Nuclear Systems. MYRRHA is an accelerator driven system (ADS) aimed at providing protons and neutrons for various R&D applications. It consists of a proton accelerator coupled to a subcritical fast core equipped with a spallation source. If the spallation source is replaced by fuel elements the system is able to work as a critical reactor. MYRRHA will be the world's first large facility allowing the demonstration of the ADS concept and aiming at the transmutation of nuclear spent fuel. The research on transmutation complements the decision in favour of the geological disposal by reducing volume, radiotoxicity and thermal load of the nuclear waste. MYRRHA will be the only fast spectrum irradiation facility in the EU and will offer a unique environment for the development of GEN IV systems (Sodium Fast Reactor, Gas Fast Reactor, Lead Fast Reactor) and ITER (International Thermonuclear Experimental Reactor) and DEMO fusion facilities. As a critical lead-alloy based reactor, it will significantly contribute to the demonstration of the Lead Fast Reactor technology. In addition to its role in transmutation related research, MYRRHA will also

contribute to secure the supply of medical radioisotopes.

By building a new research infrastructure to replace BR2, Belgium will consolidate its current key role in the research on and production of medical radioisotopes in the context of a worldwide growing demand. In March 2010, the Federal Government decided to support 40% of the total budget (€960m) via the budgets of BELSPO and the DG Energy of the FPS Economy. During the first five years (2010-2014) a contribution of €60m has been committed in order to achieve what is called the Front End Engineering Design. An international consortium that would fund the remaining 60% of the budget will be set-up during this period and an evaluation will be carried out in 2014 in order to prepare the decision on the construction phase. MYRRHA should be fully operational from 2022-2023 onwards. In early March 2010, SCK-CEN inaugurated GUINEVERE, a low-power test reactor that will be used for the preparation of the operating and control procedures for subcritical reactors.

The Royal Military Academy, the SCK-CEN and several universities perform fusion research in Belgium. SCK-CEN aims to contribute to fusion research within the ITER, DEMO and IFMIF projects and prepare itself to become a partner in the realisation of large components for ITER.

More information at: www.sckcen.be and <http://myrrha.sckcen.be>

2.3.4

Support to R&D activities and policy

In addition to the actions supporting R&D activities directly, BELSPO also has an important, but more indirect, role in implementing support actions for R&D. This takes the form of the development of information systems, databanks, statistics on R&D activities, and the setting-up and development of an electronic highway for research players, BELNET. In addition to the aforementioned activities, the Federal Government performs a co-ordination mission for R&D activities through its leading role in the various committees created for this purpose, and especially in the FCSP, where representatives from all the regions and communities interact on STI matters of national and international interest.

BOX 13 BELNET: the network of knowledge

In the early 1990s, BELSPO established an operational unit called BELNET responsible for designing and managing the network of research and education in Belgium. Today, BELNET has its own infrastructure with over 1,650 km of fibre covering the entire country allowing BELNET to provide its users high speed (100Mbit/s nx10Gbit/s) access to the internet and the global research network. The network is open to institutions of research and education, research centres, governments and public services. About 200 institutions representing more than 650,000 users are connected to the BELNET network. In institutional terms, BELNET is part of the DG ICT of BELSPO

In addition to connectivity, each client receives, with no additional costs, standard internet services. In order to meet more specific needs, BELNET provides, upon request, additional services such as a

platform for e-collaboration or videoconferencing. This full range of services makes BELNET the preferred supplier of education and research institutes.

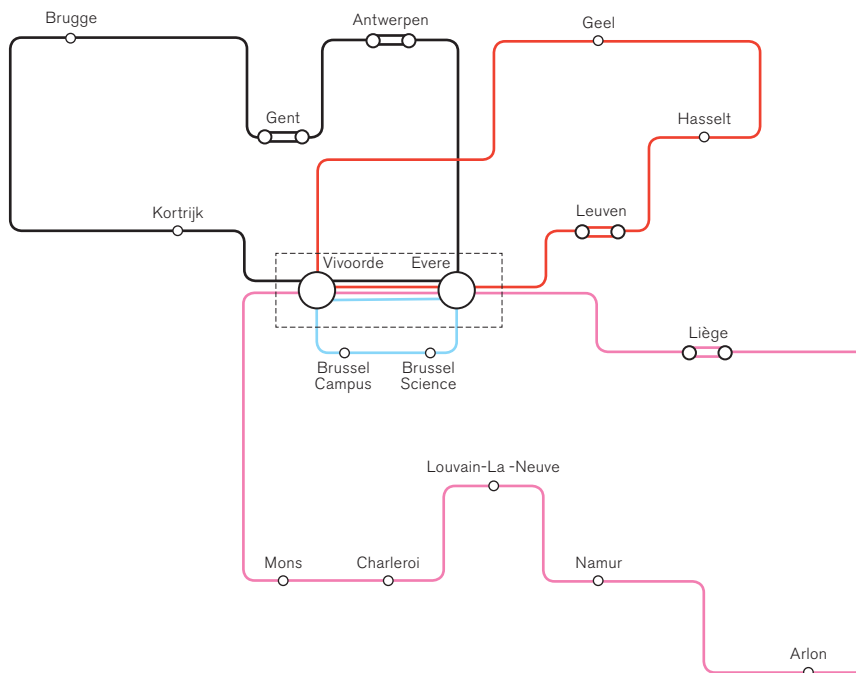
Besides its main activity, BELNET also operates a central platform for the exchange of internet traffic, called BNIX (Belgian National Internet Exchange). BNIX mainly focuses on internet service and content providers (ISPs). Finally, on behalf of FedICT, BELNET is responsible for the design and the management of FedMAN, the network of federal administrations, and of CERT.be, the Belgian Computer Emergency Response Team. In short, BELNET provides a core infrastructure that gives research and education an excellent opportunity to collaborate better; and thereby contribute to global innovation.

The most recent BELNET network has been in operation since 2008 for universities, colleges of higher

education, research centres and public services. In collaboration with the Walloon Government, Flemish Government and commercial partners, BELNET laid a 1,650 km fibre network. This hybrid network combines a traditional IP network with an optical layer. The basis for this optical layer is glass fibre.

Data communication via lightpaths is possible on the fibre network. Lightpaths are direct connections between two points without the intervention of routers. High capacity, quality and reliability are their most important advantages. Thus, lightpaths can easily transport huge data streams, which opens up new possibilities for science and education.

BELNET is also connected to the commercial internet, and to European and worldwide research networks via GÉANT. This research network links educational and research institutions worldwide.



BELSPO is responsible for the development and analysis of R&D indicators and their integration into international databases. BELSPO compiles R&D indicators on the basis of data supplied by the regional and community authorities via a special consultation group of the Inter-ministerial Conference for Science Policy. A cooperation agreement provides formal arrangements for collaboration with the partners from the communities and regions. This covers the permanent inventory of Belgium's scientific potential (documentary information on projects currently carried out in universities and research centres) and the yearly Federal overview of budgetary appropriations for science policy and R&D expenditure by the Belgian authorities. Estimates of the R&D effort of the public and private sectors are conducted on the basis of surveys. The statistical data are transmitted to international bodies like EUROSTAT and the OECD. The service participates also in the Community Innovation Surveys (CIS) supported by the EU.

Moreover the Service of R&D indicators publishes data-analysis work with a view to contributing to science policy³¹.

The Scientific and Technical Information Service (STIS) is a public service of BELSPO. Its target users are typically the various players in research and innovation (the sci-

31. http://www.belspo.be/belspo/res/ind/ind_en.stm

entific community, the for-profit and non profit sectors and the public authorities). STIS performs also specific tasks for BELSPO, in particular for the federal scientific and cultural institutions. Its activities include:

- Scientific and technical information brokerage, document delivery and promotion of information systems (support and training).
- Specialised information for and on science policy: Research.be (web portal for research and innovation in Belgium), bibliometric studies, strategic watch, etc.
- Information and assistance of the federal stakeholders regarding European research, innovation and cultural activities: Eurofed web portal and e-newsletter, help desk, and individual primary support, NCP of the Federal Government for all specific programmes of the EU FP7.
- Digital Cultural Heritage: participation in European initiatives to develop the coordination of digitisation policies, Digipat web portal, library and museum statistics, technology watch, contribution to the digitisation plan of the federal scientific institutions.

2.4

Perspectives for Federal STI policy

The preceding sections have underlined, that even after the decentralisation process that took place since the early nineties, federal science policy is still important. With 2800 people working at the BELSPO and some 2000 more in other departments (economy, defence, public health, etc.) and related institutes, the federal support for STI policy remain crucial.

This is even more evident if a 'national system of innovation' perspective is adopted. In this case, the focus goes beyond the R&D activities of the public and private sectors and the policies needed to influence them directly. Rather, there is a need to consider issues related to 'governance' (including inter-linkages between STI policy and other policies), the intensity of co-operation between the actors within the system and the general regulatory framework (including encouraging entrepreneurship and risk-taking).

Of course, a large part of the regulatory framework for STI is under the competence of the regional and community authorities. This includes, notably, legislation and regulations on universities and university research. However, there remain con-

siderable parts of the legislative corpus that falls under the competence of various federal departments (tax, social security, and labour, internal and foreign affairs, commercialisation and patent laws, etc.) and that are of utmost importance for successful STI policies. Hence, when discussing wider innovation policies these issues have to be taken on board.

These issues have been reviewed in the policy mix peer review³² that viewed the national policy mix as the sum of all STI policies, whatever the level of authority or the department involved. One of the main recommendations of this report concerns the lack of possibilities for (nationally subsidised) cooperation between research actors from the south and north of the country. Another recommendation concerned the need for tax credits that has become a cornerstone of the federal intervention in the last five years or so.

Secondly, the Federal Government continues to pursue its own distinct science policy. A number of research programmes, initiatives and institutions have been launched or prolonged, launched or institutes being financed. The future challenges for the Federal Science Policy Office's research programmes are two-fold:

- to continue to elaborate successful research programmes. Many past programmes were build around societal challenges (climate change, biodiversity, social challenges, etc.) that obviously are not rapidly solved but rather constantly change in nature. So, a first challenges consists in continuing the successful programmes taking into account both new policy questions but the fact that money will be rather scarce in the near future.
- secondly, synergies have to be created between federal programmes, federal research institutes and the activities of the other authorities. In particular, the policy mix peer review recommended to build bridges between private R&D carried out in the different regions and to find ways to support such collaboration. A concentration of federal research activities would make sense.

In presenting the 2009-2010 work-programme of BELSPO to Parliament, the Federal Minister for Science attached special importance to two specific activities:

- the inter-university attraction poles: this is one of the rare programmes fostering cooperation between researchers from the north and the south of the country. The research networks created have been of high quality. This programme will be evaluated and, if judged opportune, prolonged.
- The scientific station on Antarctica was launched in 2009; optimal use of this base will be one of the objectives for the coming years.

32. See, the OMC Policy Mix Review Report (2007) available at: http://www.belspo.be/belspo/stat/papers/pdf/Rapport_PEER_REVIEW_EN.pdf

A second main plank of Federal policy is space research, where Belgium has developed a very ambitious space programme making it the biggest of all the 'small countries' regarding space activities. The Federal Government aims to prolong an important investment programme for this sector, including, notably: diversification to new applications; to new firms (especially SMEs that are not active enough); strengthening the knowledge base of current firms and make them less dependent on government funding. For example, this could be achieved by strengthening the links existing between research institutes, universities and the companies in the space sector.

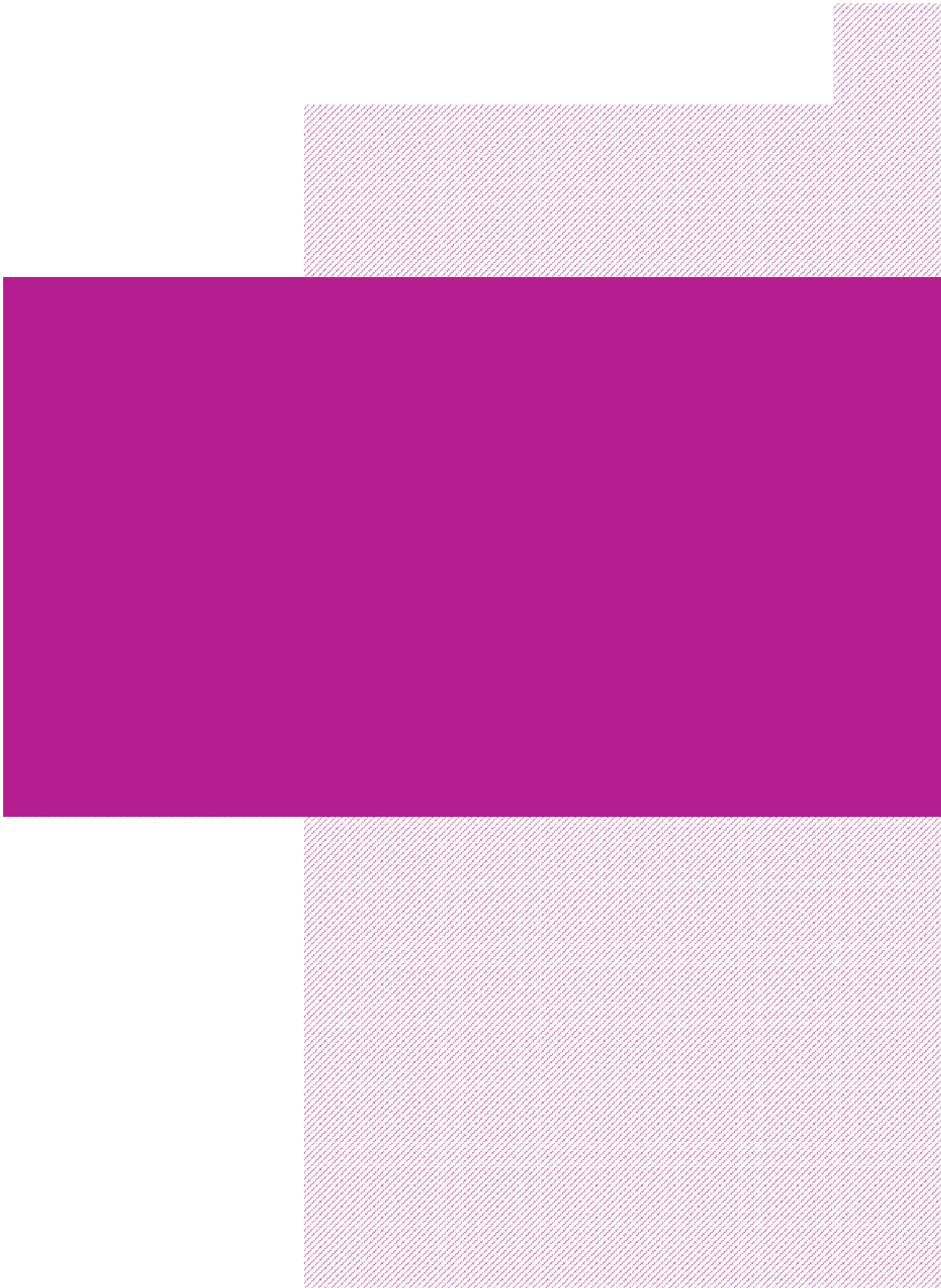
The management of the Belgian space sector needs to remain extremely flexible in order to facilitate relationships with the actors concerned (industry, universities, etc.). This organisational model, implemented by BELSPO for the last 30 years, is widely supported by the partners.

The federal scientific institutes play a very important role when it comes to conserving and further developing the common heritage of all parts of the country. The institutes are being modernised and the digitalisation of their collections is part of that modernisation process. Recent years have witnessed the completion of a number of successful projects, including: the new Magritte museum; the renovation of the Royal Institute of Natural Sciences; the projects to renew the Royal Museum for Central Africa and so on. Impact studies of these institutes have made clear that the broader social and economic (tourism revenues, etc.) impact should not be underestimated.

The Federal Government intends to pursue the modernisation of the scientific institutes and to reinforce the synergies between them. Moreover, not all of the federal scientific institutes report to the Minister of Science Policy. As such they play an important role in supporting the missions of the FPS they belong to; for instance, the institutes for public health, criminologicals, etc. have a strong reputation in their field. Last but not least the nuclear research centre should be mentioned since the quality and strategic importance of the work done is clear given the intensity of Belgian participation in Euratom research, which is well above a 'juste retour'.

Belgium is an active participant in the work of ESFRI with a view to identifying the new international research infrastructures that will be needed in the future. A Belgian roadmap is being drawn up with the participation of all the Belgian authorities. The Federal Government is committed to play its part in the future investments proposed. BELNET is, of course, another example of an investment in infrastructure. All the universities, and many research institutes, use the broadband network. BELNET is expected to grow even faster in the near future, which is a corollary of the growing demand for this type of services.

In closing, the future policy perspective of the federal authorities needs to take account of the wider innovation context. As in neighbouring countries, Belgium will have to mobilise all the relevant instruments and competencies of the knowledge triangle: education, research and innovation; irrespective of whether the policies are managed at the federal level or not. The federal authorities have invested in reforming patent policy, R&D tax policies, the broader regulatory framework, etc.; and will continue to give attention optimising the framework for innovation in the near future.





3. FLEMISH SCIENCE, TECHNOLOGY AND INNOVATION POLICY

As explained in section 1, at the time of the second constitutional reform in 1980, the Flemish authorities merged the community and newly established regional institutions. A single Flemish Parliament, Flemish Government, official consultative bodies and an administration, supported by specific agencies, oversee both community and regional competencies. The Flemish Parliament debates and legitimates all official legal decisions pertaining to both community and regional competence, whilst the Flemish Government is charged with policy execution.

3.1

General orientations of Flemish STI policy

For a number of years, the world has been experiencing a rapid evolution and profound transformation towards a knowledge-based economy and society. The Flemish Government is aware of the importance of these trends and considers research and innovation as a necessary condition for maintaining wealth and well being in Flanders. Since the 1990s, the Government, in consultation with the social partners, has developed a broad-based strategy on STI: the development of an efficient policy mix, the implementation of a diverse set of policy instruments and the allocation of related budgets. Since the middle of the 1990s, Flanders has devoted increasingly more, in absolute and relative terms, public budgetary appropriations to R&D, so that by 2008, Flanders accounted for close to half of the Belgian GBAORD.

STI policy is developed through a number of agreements, initiatives and statements, including:

- the government agreement in which the political parties forming the governing coalition outline their priorities for the five-yearly parliamentary term;
- the policy note of the minister charged with scientific research and innovation for the five-year period;
- the annual policy letters of the minister, which further elaborate and specify the general policy framework announced in the policy note.

Moreover, a number of multi-annual strategic plans and targets have been agreed upon by a broad-ranging group of stakeholders from government, civil society and industry. These plans set out a set of targets across a range of policy fields, amongst which STI is assigned a clear priority. The main plans adopted since 2000 are:

- the ‘Vilvoorde Pact: 21 targets for the 21st century’ (2001), a transposition of the EU’s Lisbon Strategy of 2000 into Flemish policy (see below);
- the Innovation Pact (2003), a commitment by Flemish public and private stakeholders to meet the EU’s Barcelona target (GERD/GDP ratio of 3% by 2010);
- in 2005, the Flemish Innovation policy plan (‘Vlaams Innovatiebeleidsplan’) based on nine pillars and aimed at a horizontal approach towards innovation throughout the different policy areas and sectors;
- the 2005-2008 and 2008-2010 Flemish Reform Programmes, which transposed into Flemish policy the reorientation of the Lisbon Strategy in 2005 into the EU Growth and Jobs Strategy, based on national reform programmes and annual reports;
- Flanders in Action (Vlaanderen in Actie, ViA), which updates and supersedes the Vilvoorde pact, and the related 2020 Pact.

ViA aims to place Flanders in the top-5 EU regions by 2020 and identifies strategic breakthroughs, crucial for the future wealth and well being of all in Flanders. The breakthroughs are: the open entrepreneur; Flanders learning society; Innovation centre Flanders; Green and dynamic urban region; Europe’s smart hub; Caring society; Decisive governance. STI play a transversal role across these various themes and policy initiatives taken in these areas are expected to match the overall goals of the ViA framework. The importance of STI in ViA is reflected by the target to spend 3% of GDP on R&D by 2014. In addition to this target, the ‘breakthroughs’ of ViA are translated into 20 targets in the 2020 Pact³³, these include:

- Flanders will progress towards a competitive and multi-faceted knowledge economy distinguished by the generation of sustainable prosperity and welfare. In terms of prosperity and welfare, and investments, it will rank among the top five knowledge-intensive European regions;
- Innovation will be more widely and better distributed across all sectors, types of businesses, and segments of society.

In concrete terms, targets set include: a year-on-year increase of the number of patent applications, to be amongst the EU’s top-5 regions for public spending on eco-innovation, an increase of turnover from new or improved products and services, and a higher share of spearhead areas such as ICT and health, logistics, smart electricity networks (GRID) in the economy.

The 2009-14 Flemish Government agreement explicitly restates that Flanders aims to reach the 3% target, reconfirmed as a EU objective in the Europe 2020 strategy in March 2010, and includes the intention to draw up a new Innovation Pact (as a successor to the 2003 pact).

33. www.flandersinaction.be

The strategic targets for STI listed in the 2009-2014 policy note of the Flemish Minister for Scientific Research and Innovation are:

- From idea to economic commercialisation, market results and societal impact;
- More creative and innovative entrepreneurship;
- Focus on economic clusters, thematic spearheads and large projects;
- Flanders as an international player (e.g. fully-fledged partner in the European research and innovation area);
- Strengthen excellence and dynamism of cutting-edge non-oriented research as a fundament for innovation;
- Increase opportunities for research talents;
- More streamlined and output-driven research policy;
- A top research infrastructure.

Each of these strategic targets consist of a number of operational targets that serve as a basis for policy-making initiatives, which are proposed in the annual policy letters, and linked to budgetary allocations. For instance, the strategic target of 'more creative and innovative entrepreneurship' consists of the following operational targets:

- Optimising the innovation instruments aimed at SMEs;
- Broadening and prolonging the innovation trajectory eligible for support;
- Stimulation of co-operation between knowledge institutes and the business world;
- Stimulation of innovation on the shop floor: innovative labour organisation;
- Optimising the functioning of innovation centres;
- Awareness raising for creative and innovative entrepreneurship.

Finally, a basis for policy priorities (linked to ViA and the Pact 2020) was proposed in a 2006 opinion of the Flemish Science and Innovation Policy Council. This opinion described six strategic clusters based on a SWOT analysis of Flanders versus the EU, combined with a European foresight study of 15 key areas. After an expert consultation, the clusters were redefined into the following 'spearheads' for technology and innovation:

1. Transportation - Logistics - Services - Supply chain management: coordinating the Flemish Logistics Knowledge Centre and Platform
2. ICT and Services in Healthcare (e-health):
 - A. Interoperability of ICT-systems: test and validation bed
 - B. Telemonitoring in Flanders
3. Healthcare:
 - A. Translational Medicine (Centre for Medical Innovation, CMI)
 - B. Nutrition, breakthrough initiative on the relationship Food-Health (Fevia Vlaanderen)
4. New Materials - Nanotechnology - Manufacturing industry:
 - A. Nano-electronics, COHESI - Complex heterogeneous systems integration (IMEC)

- B. New materials, SIM Strategic Initiative Materials (Agoria Vlaanderen³⁴)
 - C. Manufacturing industry (Complex integrated systems (Sirris – Agoria Vlaanderen)
 - D. Chemistry, FISCH – Flanders strategic Initiative for Sustainable Chemistry (Essenscia Vlaanderen)
5. ICT for Socio-economic innovation: Flemish enabling platform focusing on innovative services (e-health, e-gov, e-learning)
 6. Energy and Environment: Flemish Smart Grids Platform (intelligent energy networks) (Voka)

These initiatives, based on an interaction of research and innovation with other specific policies and with overall socio-economic objectives, clearly demonstrates the relative importance of STI in the Flemish policy-agenda. In the coming years, these objectives require the design and implementation of appropriate policy measures. These must take into account the significant societal as well as economic challenges, and be in line with a number of major EU initiatives, such as the EU 2020 strategy, the Commission's Research and Innovation Action plan (due July 2010), and the ERA.

3.2

Actors and instruments of the Flemish STI policy

A wide range of actors and stakeholders are involved in the Flemish STI system: public administrations and agencies, knowledge institutes and centres, universities and university colleges, scientific institutes, public research organisations (PROs), university hospitals, various collective research centres, incubation centres, private companies, professional (technology and other) organisations, etc. Science and fundamental research (community competencies) and innovation and applied research (regional competencies) are managed in one specific commission in the Flemish Parliament, by a single minister responsible for scientific research and innovation, an advisory council (VRWI) and a single administration responsible for preparing all related policy issues. At implementation level, the Agency for innovation by Science and Technology (IWT) manages the regional competencies; while for the community

34. Agoria is Belgium's largest employers' organisation and trade association. The companies represented by Agoria are active in 13 branches of the technology industry: aerospace, automotive, construction products, contracting & maintenance, electrical engineering, industrial automation, ICT, mechatronical engineering, metals & materials, metal processing, mounting & cranes, plastics, security & defence.

competencies, specific funding agencies (notably, the Research Foundation Flanders (FWO), Hercules research infrastructure fund and the Special Research Fund (BOF)) support universities, university colleges, scientific institutes, etc. of the Flemish Community located in both Flanders and the bilingual Brussels-Capital Region.

The following section presents an overview of the missions and activities of the main (public) actors and some of their policy instruments. **FIGURE 14** provides an overview of the key actors in the Flemish STI policy system.

FIGURE 14 Flemish STI policy system (read table from left to right; top line are various policy levels surrounding the Flemish policy level; bottom line are research performers acting within the different STI-organisations)

OTHER POLICY LEVELS	FEDERAL AUTHORITY (BELSPO, FPS ECONOMY, OTHER DEPARTMENTS, SCIENTIFIC INSTITUTES, ETC.)	EU: POLICY; PROGRAMMES AND INITIATIVES: RESEARCH AND INNOVATION SUPPORT (FP, CIP, ERDF, JTI, EIT)	MULTILATERAL POLICY LEVEL (UN, OECD) (E.G. UNIDO (BIOTECH FUND FLANDERS), FLANDERS UNESCO SCIENCE TRUST FUND)	INTERGOVERNMENTAL AND INTERNATIONAL COOPERATION (EUREKA, COST, EMBL, ETC.)	BILATERAL COOPERATION INTERREGIONAL NETWORKS
FLEMISH POLICY LEVEL	Flemish Parliament (VP): Parliament Acts	Flemish Government (VR): Parliament acts, decisions, government agreement, Flanders in Action (ViA), Pact 2020		Flemish minister(s) Policy note, Policy letters, decisions, (ad hoc) initiatives, VRWB advice on 6 clusters	
POLICY ORGANISATIONS: DEPARTMENTS, PUBLIC INSTITUTIONS, ADVISORY BODIES	EWI department	Education and Training department	Other departments of the Flemish government	VRWI advisory body (to VP and VR) IST advisory body (to VP)	Public academic institutes (KVAB, KAGB, KANTL, STV)
POLICY ORGANISATIONS: IMPLEMENTING AGENCIES	IWT (innovation support)	FWO (fundamental research)	Hercules (research infrastructure)	PMV (guarantees, loans)	AO & other agencies
(SEMI)-PUBLIC ORGANISATIONS: RESEARCH AND INNOVATION ACTORS	4 strategic research centres (PROs) (IMEC, VIB, VITO, IBBT) 2 PROs starting-up (CMI, SIM)	4 scientific institutes (INBO, ILVO, KMSKA, VIOE)	Other knowledge institutes: (ITM, VLIZ, NERF, MIP2, UAMS, Vlerick School, etc.)	6 Universities 22 University colleges [5 Associations]	14 Policy Research Centres
COLLECTIVE RESEARCH, COOPERATION ORGANISATIONS AND INNOVATION NETWORKS	8 excellence centres (FMTC, VIL, Flanders Food, VIM, Flanders InShape, Flanders' DRIVE, Flanders' Synergy, Flanders' PlasticVision)	VIS cooperation projects (VRI, VLI, VEI, Leuven DSP Valley, VKC, Clusta, VIGC, etc.)	Collective Centres (incl. De Groote centres)	Financial intermediaries (e.g. GIMV, BAN Vlaanderen, Vinnof, Biotech Fund)	Advisory networks: Flemish Innovation Network (VIN), sub-Regional Technological Centres, Europrogs, EEN Vlaanderen, Flanders DC
USERS AND IMPLEMENTING ENTITIES	Researcher (university, university college, PRO, scientific institute, knowledge centre, company, other etc.)	Government agency (OVAM, VEA, etc.)	Project with various partners (as user or actor, financial entity, policy level, etc.)	Company, non-profit entity, etc.	Sector, federation, professional organisation

3.2.1

Policy advice

3.2.1.1

Flemish Science and Innovation Policy Council (VRWI)

The VRWI is the advisory body of the Flemish Government and Flemish Parliament for science and innovation policy. Established by an Act of the Flemish Parliament on 30 April 2009, it is the successor of the VRWB, Flemish Science Policy Council. The Flemish Government is obliged to ask for its advice on:

- the preliminary drafts of parliamentary acts concerning science and innovation policy;
- the draft decisions of the Flemish Government that concern science and innovation policy and that are of strategic importance.

Furthermore the VRWI can, on its own initiative or by request, give advice, make recommendations, conduct surveys and generally provide contributions on matters related to STI policy. The Flemish Government can authorise the VRWI to represent Flanders in federal or international advisory bodies.

3.2.1.2

Institute Society and Technology (IST)

The IST (Instituut Samenleving en Technologie) is an independent and autonomous institution, linked to the Flemish Parliament. It investigates the societal aspects of scientific and technological developments. This is done on the basis of study and analysis, by structuring and stimulating the social debate, by observing scientific and technological developments at home and abroad, by conducting prospective research into these developments, by informing its target groups, and by advising the Flemish Parliament based upon these activities.

3.2.2

Government departments

3.2.2.1

The Department of Economy, Science and Innovation (EWI)

The EWI (Economie, Wetenschap en Innovatie) Department of the Flemish government manages policy-making in the field of STI. The department was established in 2006 in a major administrative reform, entitled BBB ('Better Governing'), of the Flemish public authority. Previously the competencies and activities of the EWI were divided between two distinct departments. Through the merger, the Flemish Government emphasised the interlinkage between economy and entrepreneurship on the one hand, and scientific research and innovation, on the other.

Similar to all other Flemish policy areas, the EWI policy area consists of a policy-preparation department and several policy-executing agencies.

The role of the EWI department is to prepare, monitor, and evaluate public policy in the field of economic support (including entrepreneurship), science and innovation, to contribute to more wealth and well-being in Flanders. Thereto, it aims at stimulating:

- excellent scientific research;
- an attractive and sustainable business climate;
- a creative, innovative and entrepreneurial society.

More specifically, the EWI department:

- prepares all legislative initiatives in the field of science, research and innovation;
- promotes close co-operation between research institutions, HEIs and companies;
- promotes a positive image of STI through an annual action plan;
- prepares multi-annual management agreements with a number of organisations, such as the Flemish strategic research centres, the FWO, or the Flanders Marine Institute (VLIZ);
- evaluates policy instruments and organisations that receive governmental support;
- coordinates on all STI topics within and outside the Flemish Government;
- holds the responsibility for the direct implementation of a few policy instruments, examples of these being the interface services, the IOF (Industrial Development Fund), the Steunpunten (policy research centres) or the PWO (project-based scientific research conducted at university colleges).

Since 1993 and the devolution of competence for international affairs, a substantial effort has been made towards the internationalisation of STI policy. For instance, the department plays a leading role in the preparation and follow-up of policy initiatives at bilateral (regional or country), EU, interregional, or international (OECD, UN) policy levels. In particular, there is a focus on an active involvement in the EU's research and innovation policies, through:

- the preparation of decisions within the EU Competitiveness Council (Industrial Policy and Research subgroups);
- the EU's FP7: preparation of the themes in the programme, programme committee members, involvement in ERA-Nets, OMC-networks, and support actions;
- the EU's CIP: coordinator for Flanders for the three thematic pillars;
- the preparation of ERAC and EPG meetings at which the EU's respective research and innovation policy is being prepared;
- contributions to reports and consultations at EU level on economy, entrepreneurship, science and innovation. Examples are the Flemish and Federal National Reforms Plans and annual follow-up reports in response to the Lisbon

Strategy / EU 2020 Strategy, the EU Trendchart on Innovation, the EU Innovation Action Plan, or several thematic or specific questionnaires and peer reviews of university research or PROs;

- the participation in ERDF networks related to R&D and innovation;
- the participation of Flemish institutes and companies in COST.

Apart from the EU level, the department holds numerous representation functions linked to preparation and follow-up policy-making and activities of multilateral organisations. For the OECD this involves the CSTP (Committee on Science and Technological Innovation Policy), the TIP (Technology and Innovation Policy), the NESTI (National Experts on Science and Technology Indicators) group, and the thematic subgroups such as on ICT, biotechnology, researchers' mobility, etc.

At UN level, the EWI department manages the Flanders' UNESCO Science Trust Fund (FUST), and supports specific initiatives such as UNIDO in the field of biotechnology, or the IODE in the area of marine sciences.

3.2.3

Other bodies of public interest in the field of science and innovation

A number of long-standing public institutes related to science policy, in a more academic context, exist as well. These institutes play a promotional or advisory role and are not directly involved in policy-making.

The Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten (KVAB, Royal Flemish Academy of Belgium for Sciences and Arts) was originally established in 1772 by the Austrian empress Maria Theresia, and is an independent learned society for the practice and promotion of science and arts in Flanders. To achieve this goal the Academy organises an array of scientific and cultural activities. Also it encourages the collaboration between the Flemish universities, it delegates representatives to international organisations and discussion meetings (contact-forums) and it attracts foreign scholars to develop research activities. The KVAB advises on matters of social importance on behalf of the government, industry, educational establishments and research centres and finally the Academy awards prizes to talented and promising researchers and artists. It is structured in four scientific fields: nature sciences, human sciences, arts and technical sciences.

A related institution of the Flemish Community is the Koninklijke Academie voor Geneeskunde van België (KAGB, Royal Academy for Medicine of Belgium), active in the field of medicine, pharmacy, animal medicine, and related sciences. It aims

to promote scientific research through the award of scientific prizes, organise lectures and meetings, and scientific publications. Moreover, it provides advice to the Flemish and Federal Governments scientific practice, education and training, and professional practice in the health field.

The Koninklijke Academie voor Nederlands Taal- en letterkunde (KANTL, Royal Academy for Dutch Language and Literature) was established in 1886 and promotes Flemish culture and literature, on the one hand, and research on the Dutch language, culture and literature on the other.

The Stichting Technologie Vlaanderen (STV, Flemish Foundation for Technology Assessment) – Stichting Innovatie en Arbeid (Foundation Innovation and Work) is part of the SERV (Sociaal-Economische Raad van Vlaanderen, Flanders Social and Economic Council) and a knowledge centre in the field of organisational and technological changes related to employment. It conducts policy-related research for the Flemish employers' and unions' associations and advises the Flemish Government.

The Vlaamse Academische Stem (VLAAS, Flemish Academic Centre for Science and the Arts) is a non-profit organisation supported by both the KVAB and the KANTL. It promotes science and culture in Flanders through lectures and congresses, awarding prizes, etc.

3.2.4

Implementing agencies

Whereas the Flemish Government's departments prepare, monitor and evaluate public policy, a number of agencies are charged with the implementation of policy decisions. In the STI field, there are four agencies, aimed at different target groups:

- IWT → industrial R&D and innovation support
- FWO → Research Foundation Flanders
- Hercules → Research infrastructure
- PMV → Flanders Holding Company.

3.2.4.1

Agency for Innovation by Science and Technology (IWT)

IWT (Agentschap voor Innovatie door Wetenschap en Technologie)³⁵ is the one-stop-shop for all industrial R&D and innovation support in Flanders. The agency was setup in 1991 by the Flemish Government and assists companies, research centres and knowledge centres in realizing their research and development projects, by

35. www.iwt.be

offering funding, advice and a network of potential partners in Flanders and abroad. More specifically, it encourages innovation through:

- Funding: financing innovative projects of companies, research centres, collective research initiatives, organisations and individuals through assignments set by the Flemish Government;
- Advice and services: support to all Flemish companies and research centres by helping these during their applications, or providing technological advice during their innovative projects;
- Co-ordination and networking: stimulating cooperation by bringing innovative companies and research centres in contact with Flemish intermediate organisations that stimulate innovation. To this end, IWT established the Flemish Innovation Network (VIN³⁶);
- Policy development: supporting the Flemish Government in its innovation policy, e.g. by studying the effectiveness of the Flemish innovation initiatives.

IWT supports all types of innovators in Flanders:

- Companies that are actively innovating, from small start-ups to multinationals with a branch in Flanders. Specific attention is paid to SMEs, whilst partnerships of companies and knowledge centres (e.g. excellence centres, innovative co-operation networks or clusters) are also eligible for innovation support;
- Individual researchers and research centres: can apply to IWT for the appropriate support and receive funding, advice and contacts with potential partners for innovative scientific research, applied research and technology transfer;
- Organisations: financial support to various types of organisations (e.g. collective research centres) that stimulate innovation in Flanders. IWT also unites these organisations via the VIN to facilitate active support of innovation.

Annually, the Flemish Government provides IWT with a budget to finance R&D by and for businesses; in 2008 IWT disbursed €297m to innovative projects in Flanders.

BOX 14 R&D business support (2 types: industrial R&D projects and R&D feasibility studies)

About 30% of the IWT's direct financial support measures are R&D and innovation grants for individual companies. This is allocated via the industrial R&D projects funding programme. It provides direct support to companies for research and development projects initiated with the purpose of developing innovative solutions. Innovation means that the projects must result

in new knowledge that has practical applications leading to the creation of economic added value and possibly other benefits for Flemish society.

All types of companies, SMEs included, are eligible for R&D funding, including for non-technological innovation, and it is possible to submit a proposal with other companies or research

institutes. Type 1 are industrial R&D projects with a budget per project of 100,000 to 5,000,000 euro, running for upto three years; type 2 are R&D feasibility studies with a maximum of 50,000 euro per project, over a maximum period of one year. In both cases, additional support is possible depending certain criteria.

36. www.innovatienetwerk.be

BOX 15 Post-doctoral Research Fellowships (OZM)

A research fellowship of IWT is aimed at assisting top researchers to make an important contribution to the commercialisation of scientific research in companies. The research fellow is guided by a scientific and an industrial promoter. There are three types of research fellowships:

- **TYPE 1:** aimed at preparing a spin-off;
- **TYPE 2:** aimed at the transfer and implementation of research results from a research institute towards a company (incl. spin-offs). The OZM activities mainly take place within a company of the industrial promoter;
- **TYPE 3:** the commercialisation or the preparation to commercialise (or to implement) research results from a research institute.

The first two types are oriented towards commercialisation of research results and in addition aim to improve mobility of the researcher, out of their university or PRO. Type 3 focuses on extending research with a potential for industrial or social applications in Flanders

The agency applies a bottom-up approach: subsidies and advice are attributed to initiatives proposed by the actors themselves and any project including a technological innovation component is eligible for funding. Apart from direct financial support through a wide range of different support measures, the policy mix of IWT also consists of various forms of indirect support and services (advice, technology scans, partner search, networking). There exist relatively few thematic Flemish research programmes and support is to a large extent awarded through generic initiatives.

Overall, R&D and innovation support to businesses and knowledge centres in Flanders is provided through three main categories: R&D projects (aimed at large companies and SMEs); individual researchers and knowledge centres; co-operative innovation initiatives. **FIGURE 16** provides an overview of the different support measures based on this categorisation.

BOX 16 Strategic Basic Research (SBO)

The aim of the SBO (Strategisch BasisOnderzoek) programme is to contribute to new ideas and concepts that can become the basis for a new generation of products, processes or services. SBO provides 100% funding of research by a PRO. Companies can also participate in the implementation of a project. These projects are supported according

to the criteria of the R&D business support measure. The SBO programme covers on the one hand an economic part, whereby the final objective is commercialisation. The results of these projects are transferred to companies. On the other hand, it also includes a part whereby the final aim is societal use. In the latter case it is possible to receive

a maximum of 100,000 euro for a preliminary phase: for setting up a consortium and users' group and to jointly define the project. Annually the IWT supports 15 to 20 projects and approximately 10 preliminary phases of SBO, and approximately 2/3 of the supported projects have an economic aim and 1/3 a societal aim.

BOX 17 **VIS: Co-operative Innovation Networks**

An important tool of IWT to support (collective) research and cooperation in innovation is the VIS (Vlaamse Innovatiesamenwerkingsverbanden) programme. Approved by the Flemish Government in 2002, VIS includes both direct funding and various types of advice or guidance. The VIS scheme consists of six project types and two programme types (see **FIGURE 15**) with each type focusing on support either for advice/guidance or for cooperation. The support provided by the VIS

scheme covers a broad variety of possibilities through funding for three types of activity:

- collective research (VIS co-operation projects, excellence centres, collective research projects);
- technology advice (TD);
- stimulation of technological innovation by theme (TIS) of sub-regionally (RIS)

For instance, through the VIS-RIS, IWT has set up innovation centres in the provinces of Flanders to inform, stimulate and guide

businesses on innovation matters (www.innovatiecentrum.be). Support for a research project in a collective research centre is available through the VIS-CO projects. In the elaboration of such project, a combination of funding exists from public and private sources. Further information on collective research, and on the excellence centres and VIS co-operation projects in different industries, is provided in 3.2.5.4.

FIGURE 15 **VIS project and programme types**

PROJECT	PROGRAMME
CO: Collective research	VIS Competentiepolen (Excellence centres)
TIS: Thematic Innovation Stimulation	VIS Proeftuinen (Testing grounds)
TD: Technological advice	
RIS: Sub-regional innovation stimulation	
VIS feasibility studies	
VIS Co-operation projects	

IWT acts as a one-stop shop for companies and research centres to access innovation funding in Flanders and at EU level. It provides access to Flemish support and funding programmes and to the various EU funding programmes and initiatives (FP7, CIP, ERDF). It is the NCP for Flanders for supporting applications to thematic programmes within FP7, ERA-nets, INNO-nets, EUREKA, Joint Technology Initiatives (JTIs), or Ambient Assisted Living (AAL)³⁷.

37. see: www.europrogs.be

FIGURE 16 Innovation support in Flanders by type

R&D BUSINESS PROJECTS	KNOWLEDGE CENTRES & INDIVIDUAL RESEARCHERS	COLLECTIVE RESEARCH & R&D AND INNOVATION COLLABORATION	ADVICE AND GUIDANCE FOR R&D AND INNOVATION
O&O bedrijfssteun (R&D business support; 2 types: → industrial R&D projects → R&D feasibility studies)	Strategisch Basisonderzoek (SBO, Strategic Basic Research)	VIS-Collectieve Onderzoeksprojecten (VIS-CO, Collective research projects)	Vlaams Innovatie-netwerk (VIN, Flemish Innovation Network)
KMO Programma (SME Programme; 2 types: → SME innovation projects → SME feasibility studies)	Strategische onderzoeksbeurzen (SB, Post-graduate strategic research Grants)	VIS-Thematische Innovatiestimulering (VIS-TIS, Thematic Innovation Stimulation)	VIS-Regionale Innovatiecentra (VIS-RIS, sub-regional innovation centres)
	Onderzoeksmandaten (OZM, Post-doctoral Research Fellowships)	VIS- Samenwerkingsprojecten (Co-operation projects)	VIS- Technologische dienstverlening (VIS-TD, technological advice)
	Toegepast Biomedisch Onderzoek (TBM, Applied Biomedical Research)	VIS-Competentiepolen (Excellence centres)	VIS- Haalbaarheidsstudies (feasibility studies)
	Programma Landbouwkundig Onderzoek (LO, Agriculture Research Programme)	VIS-Proeftuinen (Testing grounds)	Innovatief aanbesteden (IA, Innovative Public Procurement)
	Programma Innovatieve Media (PIM, Innovative Media Programme)	TETRA Fund	NCP (National Contact Point for the EU FP on RTD)
	Baekeland Fellowships	Other (e.g. participation in Eureka, Innovation vouchers, cross-border (bilateral) co-operation)	E.E.N. (Enterprise Europe Network, includes the ex-IRC network Vlaanderen)

Moreover, through the Enterprise Europe Network (EEN)³⁸, IWT stimulates international collaboration by bringing Flemish companies and research centres in contact with foreign partners and assisting them in penetrating new markets for their technology transfer projects.

IWT also shares best practices with other European agencies and is involved in various international networks and actions. It is for example, a member of the Association for Technology Implementation in Europe (TAFTIE)³⁹, which fosters an exchange of best practice between 18 government agencies supporting innovation in Europe.

38. see www.vlaanderen.be/enterprise-europe-network

39. see www.taftie.org

3.2.4.2

Research Foundation Flanders (FWO)

The main mission of the FWO (Fonds voor Wetenschappelijk Onderzoek Vlaanderen)⁴⁰ is to deepen knowledge about humans and their environment through funding basic research that extends the boundaries of knowledge carried out in universities and in affiliated research and knowledge institutes. The FWO supports and stimulates basic research through scientific inter-university competition in order to increase the existing stock of knowledge and state-of-the-art research in all disciplines. It is the basis for new knowledge contributing to building up goal-oriented, applied, technological and strategic research. Researchers can apply for support from the FWO through a broad range of funding instruments (see FIGURE 17), providing they are affiliated to a university of the Flemish Community.

FIGURE 17 FWO support types

INDIVIDUAL RESEARCHERS	RESEARCH PROJECTS (CONDUCTED WITHIN RESEARCH TEAMS)	SCIENTIFIC MOBILITY (BOTH NATIONAL AND INTERNATIONAL)
doctoral thesis Ph.D. grants Special Ph.D. grants Clinical Ph.D. grants	young researchers (at the start of their academic career)	establishing scientific research networks (to promote co-ordination, national and international contacts at postdoctoral level)
postdoctoral fellowships for Ph.D. (aimed to reach an internationally recognised level)	supplying personnel, equipment and operational expenditures (to support top priority research proposals)	attracting junior and senior visiting postdoctoral fellowships (to join a FWO research project or network and bring in extra expertise)
Half-time research grants for senior clinical researchers (aimed to stimulate postdoctoral experienced clinicians)		providing grants (for organising international congresses in Belgium, international congresses, and for study and training periods abroad)
		bilateral agreements and participation in international corporate projects
		sabbatical and mobility allowances (for FWO-postdoctoral fellows)

The two main instruments of the FWO are support to individual fellowships (Ph.D. fellowships, postdoctoral fellowships, etc.) and to research projects. Furthermore, extensive means are available for international cooperation and mobility. The FWO

40. see www.fwo.be

also awards scientific prizes to distinguished researchers, often in collaboration with private companies. In 2008, the FWO had a budget of €183m, of which, almost 80% came from the Flemish Government, around 14% was generated by Federal fiscal measures and 6% were federal grants. The funding allocated to the two main types of support were divided as follows: approximately 1,500 fellowships received in total €80.6m, whilst total support for research projects was €82.5m.

In addition to the FWO funding, the EWI department provides additional support to researchers, notably €11.2m spent via the Odysseus programme on 'brain gain', which is managed by FWO (see **BOX 18**).

A system of peer review by the scientific community is used to assess all applications and scientific activity reports. To this end, the FWO puts together scientific committees including top researchers from Belgium and abroad. The FWO's scientific committees, called 'FWO Experts panels', are crucial to ensuring the excellence of FWO funded activities. FWO now has 29 specialised committees and one interdisciplinary committee, which cover all Flemish scientific research disciplines.

FWO actively stimulates international cooperation and promotes scientific mobility. Flemish researchers are offered numerous funding schemes for financing short or long-term stays abroad and research teams are offered logistic and institutional support in their collaboration with colleagues abroad. The latter is often necessary to participate in major international projects or to co-ordinate research networks or platforms. Foreign researchers can apply for a visiting postdoctoral fellowship to undertake research at a university of the Flemish Community. In 2008, €7.4m was spent on various initiatives related to the internationalisation of research: scientific research networks, visiting postdoctoral fellowships, sabbatical leaves, travel grants (attendance of congresses/short stays abroad /BHIR fellowships), long stays abroad, organisation of congresses in Belgium, co-ordination of research actions, mobility allowance for FWO-postdocs, and international co-operation (ESF, CECAM, ERCIM, etc).

FWO also works together with its European and international sister organisations in various networks and with European research organisations or similar institutes, for instance the European Science Foundation, or similar organisations and EUROHORCs, DUBBLE at ESRF, CECAM, EUPRO, ECT, etc. Agreements for bilateral research cooperation were concluded with several countries, in order to enhance international collaboration in specific domains.

BOX 18 **Odysseus, a Flemish brain gain programme**

In 2006, the Flemish Government established 'Odysseus', a so-called 'brain-gain' programme. It aims to attract Flemish and other top researchers (back) to universities of the Flemish Community. The initiative offers a limited number of excellent researchers who have built up a career outside Flanders an initial budget to set up a research group at a Flemish university or establish a research road-map and integrate progressively into the Flemish research area.

Programme management and organisation of calls for proposals is undertaken by the FWO; while the selection of candidates and promotion of the Odysseus

programme towards scientists worldwide is assured by the six Flemish universities (K.U.Leuven, UGent, UA, UHasselt, VUB, KUBrussel) who submit applications to the FWO for funding of the beneficiary researchers. The selection is made by an international, multidisciplinary, jury complemented with 'peer researchers' depending on the scientific discipline.

Support is provided for a 5-year period for an amount of:

1. between €2m-€7.5m to top researchers:
- who are internationally recognised and occupy a position at a foreign university;

- who lead a research group with a staff of several postdoctoral researchers and a number of doctorate students.
- 2. between €0.5m-€1m to researchers with:
 - the potential to evolve towards an internationally prominent status;
 - a minimum experience of three-year of postdoctoral fellowships.

There is no pre-defined allocation between the two categories of the Odysseus programme.

See: <http://www.fwo.be/en/FWOAppOdysseus.aspx>

3.2.4.3

Hercules Foundation

The Hercules Foundation (Hercules Stichting)⁴¹ was set up by the Flemish Government in 2007 with the aim to fund medium-scale and large-scale research infrastructure. The infrastructure serves for cutting-edge-driven and strategic basic research in all scientific disciplines including the humanities and the social science.

The Hercules Foundation organises calls for applications and assesses project proposals. Application may be submitted for either:

- medium-scale infrastructure: proposals submitted by HEIs;
- Large-scale infrastructure: proposals submitted by HEIs and a number of other knowledge institutes: the Flemish strategic research organisations (IMEC, VIB, VITO, IBBT), the ITM (tropical medicine), the UAMS (University Antwerp Management School) and the Vlerick Leuven Ghent Management School.

The Flemish Government funds 70% to 90% of the costs of the investment; if a third party is part of the consortium, 100% of the costs can be funded. 'Third parties' are private and public bodies (such as companies or other organisations) not necessarily established in Flanders.

41. See www.herculesstichting.be/in_English/index.php

Apart from the acquisition of research infrastructure itself, a maximum of 15% of the subsidy can be used to fund costs for necessary modifications to buildings, inter-connection and maintenance costs, and staff responsible for the continual maintenance and operation of the research infrastructure.

The Hercules mechanism distinguishes between medium-scale and large-scale research infrastructures;

- Medium-scale research infrastructure is composed of 2 types investment initiatives:
 - Hercules 1: total funding cost between 150,000 euro and 600,000 euro;
 - Hercules 2: cost between 600,000 euro and €1.5m.
- Hercules 3: large-scale research infrastructure, involving projects with budget in excess of €1.5m.

To date, Hercules' funding has been disbursed on a ratio of two-thirds to medium-scale equipment and one-third to large-scale equipment.

3.2.4.4

PMV – Flanders Holding Company

PMV (Participatiemaatschappij Vlaanderen)⁴² provides financial leverage to projects that are important for the future of Flanders, acting as an 'entrepreneur' and as a facilitator. It supports investment projects that strengthen the structure of the Flemish economy and fit the government's economic policy objectives.

The organisation creates, structures and manages co-operation with private partners. It intervenes where there is evidence of market failure and where the Flemish Government would welcome participation of the private sector in a specific domain. Its goals are to support innovative starters, facilitate growth of Flemish companies, stimulate 'spearhead' sectors, support specific sectors and solve temporary liquidity problems of creditworthy companies. To this end, it has developed a range of instruments from the pre-start phase to the international growth phase.

PMV invests in companies, projects and sustainable development. PMV's activities mainly consist of three pillars: risk capital, loans and mezzanine finance. PMV has developed a wide range of instruments aimed at different purposes as well as on various target groups. Innovative companies are eligible for support through these instruments; while, complementary incubation support is managed through IWT.

42. see www.pmv.be

FIGURE 18 PMV risk capital and investment instruments

AIM	TYPE OF SUPPORT	INSTRUMENT
Support to innovative starters	<ul style="list-style-type: none"> → Participations and mezzanine → Investing in funds → Management and allocate fiscal stimuli 	<ul style="list-style-type: none"> → Vinnof → PMV- Innovation Mezzanine → ARKImedes → Win-Win loan
Stimulate spearhead sectors	<ul style="list-style-type: none"> → Participations → Investing in funds 	<ul style="list-style-type: none"> → Direct participations → Vinnof → Cleantech fund, InVita, Aescap, Vesalius

Whereas ARKImedes (ARK = Activating risk-capital), win-win loan, and PMV Mezzanine provide funding to a range of types of companies, the ‘Vlaams Innovatiefonds’ (Vinnof, Flemish Innovation Fund) is specifically oriented towards innovative starters. It provides risk capital for the early stage of a company, with the expectation that entrepreneurs will find it easier to call upon private investors in later phases. The maximum amount per company is €1.5m, and all companies created for no more than six years can apply for support. The fund invests in companies for a limited period and aims to ensure a financial return on its investment. Vinnof invests seed capital during three stages: pre-start, start and initial growth. It does so through:

- a capital participation, possibly complemented with a subordinated loan;
- a hybrid intermediate form (convertible loan, loan with warrants, etc.).

PMV also invests in specific thematic funds after a market study and ensures an active follow-up. It has set-up a Cleantech investment vehicle, CIV that co-invests in Flemish companies; and has invested €15m into the Capricorn Cleantech Fund, the largest European risk capital fund for clean technology (+€100m). Aside from its existing investments in life sciences, PMV is allocating extra resources to act as a co-investor, jointly with Vesalius Biocapital, Aescap Venture, or other life science investors, via its subsidiary company InVita. Finally, PMV closely monitors three sectors important for renewable energy: wind energy, biomass-energy, solar energy.

3.2.4.5

Enterprise Flanders – AO

Enterprise Flanders (Agentschap Ondernemen, AO)⁴³ is an agency, within the EWI policy domain, that implements business development policy and serves as a one-stop-shop for entrepreneurs. It began activities on 1 April 2009 following a merger of the Flanders Enterprise Agency (VLAO) with the Economy Agency (AE). Hence,

43. see www.agentschapondernemen.be

AO offers the advisory services previously provided by VLAO and also manages the business support instruments previously run by AE. Support is provided through a number of instruments, such as strategic investment and training projects, the ecology subsidy, business centres and transit buildings, brownfields, mentoring projects, the bridge projects for collaboration between education and business, or the SME entrepreneurship portfolio (SME e-wallet). Through the latter, advice to SMEs about entrepreneurship, innovation, and internationalisation is combined in a single policy instrument and SMEs with operations in the Flemish Region can receive electronic support in the areas of training, advice, technology scouting, and export advice. Other initiatives are the call for entrepreneurship projects, which are part of the Entrepreneurship Action Plan, and the Action Plan for Entrepreneurship Education.

3.2.5

Innovation intermediaries

A number of intermediaries and co-operation networks exist that are active between on the one hand the government agencies that offer instruments and budgets aimed at innovation, and on the other hand the companies and industries that conduct research and innovate.

3.2.5.1

Infrastructure: science parks and incubators

In Flanders, several science parks, research parks and incubators offer facilities for research-based young companies and innovative enterprises. Often these are spin-off companies from a university or a PRO and located close to the knowledge centre, and in some cases an incubator is specifically oriented towards a particular scientific area. These are ideal sites for high-tech, R&D-intensive start-up firms, often co-operating with university laboratories. An example is the Ardoyen science park, which is part of the Zwijnaarde technology park (near Ghent). It hosts the incubation and innovation centre of Ghent university (UGent) and the bio-incubator of the VIB (biotechnology)⁴⁴, hence the majority of its 40 companies are spin-offs from UGent and start-ups of the VIB. Leuven hosts the science park Arenberg⁴⁵, with several actors related to the K.U.Leuven and IMEC, and the Haasrode Business and Research Park⁴⁶. The Flemish Government supports these science parks and incubators through both regulatory and financial means, mainly through the IWT and AO.

44. See www.bio-incubator.be and www.vib.be/TechTransfer/EN/VIB+bio-incubators/Locations

45. See www.wetenschapspark-arenberg.be

46. See www.haasrode.com

3.2.5.2

Financial intermediaries

BAN Vlaanderen⁴⁷, the business angels network in Flanders, is a platform in which starting or growing entrepreneurs seeking risk capital are matched with informal private investors, so-called 'Business Angels'. The latter offer not only money but also their own know-how, experience and contacts. BAN Vlaanderen is a market place where demand and supply meet, rather than an investment fund.

GIMV (Flanders Investment Company)⁴⁸ is Belgium's most important private equity and venture capital provider and a major European and international market player. The company has 30 years of investment experience and is listed on Euronext Brussels. Both in Belgium and abroad, Gimv makes venture capital investments in promising high-tech companies. It also focuses on buyouts and growth financing, to support companies' development and growth. Currently, Gimv manages a portfolio representing around €1.7 billion of assets (including third party funds).

The Biotech Fund Flanders was founded in 1994 and, at that time, was structured as a venture capital fund that co-invested with GIMV in businesses active in the life sciences sector. Due to the depressed situation in the financial markets, a large number of bio-tech enterprises (start-ups, growth businesses, and exchange-listed companies) experienced severe problems in arranging adequate financing, particularly as bio-tech is a capital-intensive sector with extended investment cycles (10-15 years). For that reason, the decision was taken to extend the investment and realisation terms by six years until respectively 2015 and 2020. As a result, the Biotech Fund is able to stimulate new long-term investments in the bio-tech growth sector.

3.2.5.3

Innovative networks

Collaboration is an important aspect of the Flemish innovation policy. It enables companies and knowledge centres to develop their internal know-how and to tackle common technological issues efficiently by using a shared platform for demand and supply of R&D and innovative matters. IWT has established the VIN network (Flemish Innovation Network) in which a wide variety of intermediaries and knowledge centres in the field of innovation are involved. Almost 1000 people from 175 intermediate organisations offer a wide variety of expertise and information to support innovation. Each province in Flanders hosts an innovation centre where experts provide specialised and personalised advice to any company. Apart from advice, IWT also offers information on public calls, networks or initiatives related to innovation.

47. See www.ban.be

48. See www.gimv.com

In 2004, the Flemish Government founded Flanders District of Creativity (Flanders DC)⁴⁹. This is a non-profit independent association that promotes entrepreneurial creativity throughout the region in order to make Flanders a more creative, more prosperous and more ambitious place to live and work. Apart from stimulating and promoting creativity and innovation, Flanders DC has also established a knowledge centre that conducts studies on the topics of innovation, entrepreneurship and internationalisation.

3.2.5.4

Collective research in Flanders: Excellence centres, co-operation projects, collective research projects, and collective centres

Other innovative networks involving various knowledge actors and industry (often businesses belonging to a specific sector) are supported through the VIS measure; including excellence centres, VIS co-operation projects and collective research centres.

Since 2000, the Flemish Government has supported a number of excellence centres ('Excellentiepolen'), also called competence centres/poles ('Competentiepolen'). These organisations are primarily oriented towards the structuring of and cooperation amongst actors of a specific industrial sector with relevant research and innovation potential at Flemish level. Within the excellence centres, industrial partners co-operate with PROs, universities, professional organisations, etc. Excellence centres are supported through result-oriented contracts (usually for four years) under the VIS-scheme. The main activities are knowledge creation and knowledge diffusion, with the focal point of the activities varying case by case. The organisational model is dynamic and bottom-up and the activities are focused on a large group of companies (collective character).

The initiatives⁵⁰, which are examples of the 'Triple Helix' principle, are:

- Flanders' DRIVE (automotives industry);
- VIL (logistics – Flemish Institute for Logistics);
- FMTC (Flanders' Mechatronics Technology Centre);
- Flanders' Food (food industry);
- FLAMAC (Flanders Materials Centre);
- VIM (mobility – Flemish Institute for Mobility);
- Flanders InShape (product development and industrial design);
- Flanders' Synergy (innovative labour organisation);
- Flanders' PlasticVision (plastic processing industry).

49. see: www.flandersdc.be

50. www.iwt.be/overzicht-van-competentiepolen

In 2010, a total of about €16.6m was allocated in the budget to support the centres. They are a programme type of the VIS scheme and have a broader scale of activities, a deeper integration, and more critical mass than the individual VIS co-operation projects or the VIS collective research projects (see below).

Another scheme to stimulate innovation collaboration with industry actors are VIS co-operation projects. These are aimed at co-operation between innovation actors that already receive support. In practice, some of these projects or organisations have existed since the 1990s, under the concept of 'cluster'. After the launch of the VIS-scheme in 2002, the terms and conditions for their funding were modified. Examples are the knowledge centres Leuven DSP Valley (digital processing), VKC (plastics centre), VEI (electro innovation centre), Clusta (steel plating), VRI (space industry), VLI (aerospace), VIGC (Graphic communication), etc.

The main goal of the VIS collective research projects is the creation, collection and translation of knowledge that can be exploited in a later stage by a large group of companies (collective character). It aims at groups of SMEs/companies from all industries. The demand driven character, e.g. by a joint opportunity, challenge or interest, is an important element in these projects. Next to the build up of knowledge, there is also a focus on knowledge and technology transfer with and by the targeted companies. The research in this project is conducted on a collective basis by a research organisation. Such project can be applied for by a so-called VIS: a consortium of mainly Flemish businesses; an organisation that can represent a group of companies (e.g. a professional organisation); a collective centre that is recognised as a VIS; or a combination of these. All activities that contribute to the goal of the group of companies are eligible (e.g. prototype-development, optimisation of products/processes/services, validation of test results, etc.) as long as the project results can be applied by a wide group of companies.

As noted in section 1.2, IWT has accredited a number of research centres under the VIS scheme, some of which are collective centres. Their activities are: collective research; various services of scientific or technical character rendered individually to their members; dissemination of technical information, training, etc. The centres are:

FIGURE 19 **Collective research centres in Flanders**

NAME	LOCATION
Belgian Institute for Wood Technology and Training Centre Wood	Brussels
Belgian Welding Institute (BWI)	Brussels and Ghent (research centre)
Belgian Research Centre of the Cement Industry (CRIC)	Brussels
Belgian Road Research Centre (BRRC)	Brussels, Sterrebeek (research centre)
Scientific and Technical Service Centre for the Belgian Textile Industry (Centexbel)	Brussels and Zwijnaarde (research centre)
Belgian Building Research Institute (BBRI)	Zaventem (Sint-Stevens Woluwe) and Heusden-Zolder
Scientific and Technological Research Centre for Diamond	Lier
Collective Centre of the Belgian Technology Industry (SIRRIIS)	Brussels and Heverlee

3.2.5.5

Policy Research Centres

The Flemish Government launched in 2001 the policy research centres (Steunpunten) programme to provide a scientific basis for policy. In 2006, a new generation of 14 policy research centres (2007-2011) was approved. The focus of the policy research centres is both on problem-driven short-term research and on fundamental long-term basic research on themes that the Flemish government regards as priorities and relevant to its policy. The task further includes the transfer of knowledge, the provision of scientific services, the building up of collections of data, the unlocking of data sources and data analysis. The Flemish government selects the themes on the basis of its policy priorities. It assesses research group candidacies by using scientific, policy-relevant and management-oriented criteria. On the basis of this judgement, a single candidate to become a policy research centre is accepted for each theme. The management contract sets basic rules and procedures for the running of the policy research centre, plus a long-term plan that states obligations as to the content of the research. The 14 centres include one on R&D Indicators, which, for instance, calculates the Flemish progress towards the 3% Barcelona target.

3.3

Main research and innovation performers

Aside from the business sector, R&D is mainly conducted by two kinds of actors:

- The six universities of the Flemish Community: the Katholieke Universiteit Leuven (K.U.Leuven), Universiteit Gent (UGent), Universiteit Antwerpen (UA), Vrije Universiteit Brussel (VUB), Universiteit Hasselt (UHasselt), and the Hogeschool-Universiteit Brussel (HUB-KUBrussel);
- the six PRO active in specific areas (IMEC, VIB, VITO, IBBT, SIM, CMI).

The other actors that either conduct or are involved in research and innovation are some of the 22 university colleges, the excellence centres, VIS co-operation projects, the four scientific institutes, the policy research centres, and organisations such as the ITM, VLIZ, NERF, MIP2, Vlerick School, UAMS, etc.

3.3.1

Higher education institutions

The universities represent the first pillar of the higher education system and play a major role in Flemish R&D, representing almost 90% of all non-private scientific output. In 2007, total expenditure on R&D in higher education (HERD) in Flanders, reached €739m, of which 15.6% was privately and 84.4% publicly funded. All universities share a threefold mission of education, research and services to society.

The K.U.Leuven is Belgium's largest university and one of the world's oldest, established in 1425. It has almost 35,000 students, including students from 120 countries, offers more than 60 international study programmes and a library of four million volumes. K.U.Leuven has over 4,800 FTE researchers, carrying out more than 4,000 externally funded research project. In total, it spent almost €300m in 2008 on R&D and it has 74 active and six newly established spin-off companies. In terms of scientific output, K.U.Leuven ranks among the top 10 European universities (2009 data). Ghent University (UGent) has over 31,000 students with an important foreign student population of over 1,500 EU and 1,200 non-EU students. It offers a broad range of study programmes in all branches, and several of its research groups enjoy world fame. In 2008 it spent almost €200 m on R&D (including funds of VIB, IMEC and IBBT), while the Brussels' VUB spent €70 m on R&D.

All information about on-going research of the six Flemish universities can be consulted via www.researchportal.be.

The other pillar of the Flemish higher education system consists of 22 'hogescholen', or 'university colleges'. These colleges provide higher education and advanced vocational training and increasingly their mission includes research, in some cases in co-operation with a university⁵¹, and services to society. Most of the university colleges have concluded agreements with a Flemish university to become part of one of five so-called 'associations': an official cooperation agreement between a university and one or more university colleges. University colleges that, in an association with a university, offer programmes with academic orientation are tending to embed their curricula in research more than in the past.

Only statutory registered universities and university colleges can use these designations⁵² and receive government funding to support education and research activities. Apart from universities and university colleges, there are a few other institutions and a number of other officially registered institutions: Vlerick Leuven Gent Management School, the Institute of Tropical Medicine (Antwerp), etc. Within the higher education field there exist a number of advisory bodies⁵³ and notably the VLIR (Flemish Interuniversity Council), which defends the interests of the universities, advises the Flemish government on university matters, and organise consultation between the universities.

The Flemish Ministry for Education and Training has the responsibility over and funds the major share of scientific research at HEI. The implementation of the Bologna Declaration in Flanders was shaped by the 2003 Act of the Flemish Parliament on Higher Education Reform, a 2004 Act on Participation, the 2004 Act on Flexible Learning Paths and finally, by the Act on the restructuring of higher education in Flanders approved by the Flemish Parliament in April 2008. Public support for universities can be categorised into three budgetary streams, namely a basic allowance, support granted on a competitive basis, and a variety of (project) sources.

51. For a complete overview, see: www.ond.vlaanderen.be/onderwijsaanbod/ho/hogescholen/alle.asp

52. In Flanders, accreditation as a HEI requires a formal decision of the 'Accreditation Organisation of the Netherlands and Flanders' (www.nvao.net) that a programme meets the predefined quality criteria. The NVAO is an independent accreditation body established by an international treaty

53. Others include the VLHORA (Council of Flemish University Colleges) and VLOR (Strategic Advisory Council for the education and training policy of Flanders).

FIGURE 20 Funding of universities in Flanders

BASIC FUNDING ON A DIRECT AND NON-COMPETITIVE BASIS	FUNDING FOR RESEARCH ALLOCATED ON A COMPETITIVE BASIS	FUNDING THROUGH A VARIETY OF PUBLIC AND PRIVATE SOURCES
Basic grant from the Flemish Ministry of Education and Training	FWO, BOF, and IWT grants	Various Flemish, federal, European, international public and private sources
(± 800 million euro).	(± 340 million euro)	± 10s of millions of euros
Funding of staff and educational and research infrastructure at universities Total operational subsidies for the universities consist of the basic grant, some additional operational subsidies and other subsidies (for real estate, financial burdens) and grants to other similar institutes Education and training represent ¾ while R&D represents ¼ of total support	<ul style="list-style-type: none"> – FWO = competitive funding of universities – BOF, Special Research Fund (fund managed by the Flemish Ministry for Education and Training) (= competition within a university) – Post-graduate strategic research Grants (IWT) – Post-doctoral Research Fellowships (IWT) – SBO (IWT) 	<p>Examples are:</p> <ul style="list-style-type: none"> – Flemish: Policy Research centres, thematic support e.g. on aquaculture or clinical trials, research infrastructure through Hercules, the Odysseus programme, the Baekeland grants, specialised IWT programmes on agriculture or biomedical research; – Federal: IUAP; space research; – Private: contract research with companies or PROs possibly through VIS or excellence centres; – EU programmes such as FP7, CIP, ERDF, JTI, etc.

FWO and BOF mainly support academic (basic) research: FWO support is granted based on competition between the different universities while BOF support is a targeted subsidy for basic research allocated on fixed criteria and then granted based on intra-university competition. IWT support serves industrial and strategic basic research and is granted on a competitive basis whereby applicants are evaluated based on a number of criteria. In addition to FWO and BOF funding, the EWI policy domain provides extra support aimed at further strengthening academic working conditions and research excellence, e.g. via the tenure track system, extra ZAP mandates, the Methusalem programme, access to large research infrastructure, etc.

In short, scientific research is conducted by a university, a university college, a PRO, often jointly or in cooperation with a private company or a non-profit partner. Flemish, federal, supranational and international actors can be involved in funding such research. Research in the energy field is a good example. This is conducted by several Flemish universities, as well as by some PROs: IMEC (photo-voltaics), VITO (energy efficiency, fossil fuels, bio-energy, geo-thermal energy, fuel cells, intelligent electricity networks and energy storage), and IBBT (green ICT and interdisciplinary co-operative research for smart grids). Extra support for energy R&D projects is provided via IWT. Moreover, a number of projects in the field of energy technology receive support from diverse sources:

- GENERATIONS (three sub-projects):
 - Intelligent networks – Smart Grids; €41.9m in 2009-2014;
 - Infrastructure for photovoltaic research; €13.6m in 2009-2012;
 - Offshore wind research infrastructure; €6.2m in 2009-2014.
- Photovoltaic (Flemish-Dutch cooperation) through IMEC;
- Interreg IV A-project Hydrogen Region Flanders/South-Netherlands, a total budget of €14.2m from EU, Flemish and Dutch public and private funding;
- Interreg IV A-project ‘BioBase Europe’ with Ghent Bio-Energy Valley and BioPark Terneuzen; €21.8m from EU, Flemish and Dutch public and private funding.

3.3.2

Strategic Research Centres

Flanders aims to be a front-runner in the European knowledge society and economy by continuing to build on and utilise its existing knowledge base and increase its innovation potential. Apart from the universities, the leading Flemish research and innovation actors are six strategic research centres (SOC, Strategische Onderzoekscentra) or PRO (public research organisations). Each of the centres is active in a specific research area:

- the Interuniversity Micro Electronics Centre (IMEC): nanoelectronics and nanotechnology;
- the Flanders Institute for Biotechnology (VIB): life sciences and biotechnology;
- the Flemish Institute for Technical Research (VITO): energy, materials, remote sensing and the environment;
- the Interdisciplinary Institute for Broadband Technology (IBBT): broadband research and ICT.

In 2010, two additional strategic research organisations have been set up: the Centre for Medical Innovation (CMI) and the Strategic Initiative on Materials (SIM). At this stage, a feasibility study and a research and a business plan have been developed for each centre.

The Flemish Government concludes multi-annual management agreements with each of these institutes; under which they each have to fulfil a number of result-based performance targets and in general strengthen the Flemish knowledge base with an emphasis on the commercialisation of their research. In return they receive an annual grant that varies between €23 and €45 million per institute, or nearly €150m in total (2009). The research departments of each SOC develop a strategic plan to define their mission, long-term focus and main research questions to address. The aim is to bring together companies, authorities, knowledge centres, and non-profit organisations to join forces on research projects. At the end of each

multi-annual management period, the SOC are subjected to an in-depth evaluation and peer review by the EWI department assisted by independent international experts. Thereby, the performance of the targets of their strategic plan is assessed with a focus on their activities related to research and scientific output (publications), technology transfer (patents, licensing agreements, start up companies, etc.) and communication. Moreover, the impact on the Flemish research landscape is analysed and the economic added value quantified.

3.3.2.1

IMEC: world-class research in nanotechnology and nanoelectronics

Nanotechnology deals with components of a magnitude of one nanometre (one thousand-millionth of a metre), the scale of atoms and molecule. With the leading state-of-the-art research centre IMEC⁵⁴, Flanders has a world-renowned strategic research centre in nanoelectronics and nanotechnology. In fact, IMEC is the largest of its kind in Europe employing 1,650 people from all over the world representing over 50 nationalities altogether. Apart from its main location in Leuven, IMEC has other offices located in Belgium, the Netherlands, Taiwan, the US, China and Japan.

IMEC was launched, in 1984, as a non-profit organisation as a part of the Third Industrial Revolution Flanders initiative (DIRV) of the Flemish Government. Today IMEC performs world class R&D in its clean room laboratories in the fields of nanoelectronics, nanotechnology, design methods and technologies for ICT systems. The research is ahead of industrial needs by three to 10 years. IMEC thereby bridges the gap between basic research at universities and R&D in industry. The research conducted includes digital components, organic electronics or scaling-driven nanoelectronics and is applied in healthcare, smart electronics, sustainable energy, and transport. In 2008, the operating budget of IMEC was €270m, of which €219m from contract research.

Chips and transistors, the basic building blocks for logic and memory, are both developed at IMEC. IMEC works on techniques to make transistors smaller, now concentrating on 22nm and 16nm technology. The continued miniaturisation of transistors makes electronic appliances such as DVD players, digital cameras, or mp3 players cheaper, integrating more functions and consuming less energy. As the physical limits of scaling are approaching, new materials, architectures, and techniques are required. This involves lithography (new chip patterning techniques), transistors (new materials and architectures for the basic building blocks of chips), interconnections, 3D integration, memory technologies, new materials (germanium, III-V materials, carbon nanotubes, spintronics), and supporting expertise (ultra-clean processing, analysis, characterisation).

54. www.imec.be

IMEC has unique processing and system know-how, an intellectual property portfolio, state-of-the-art infrastructure, and a strong and worldwide network which turns it into a key partner for shaping the technology of the future. It has an ultramodern research facility that is continuously expanding, including cleanroom laboratories with state-of-the-art equipment, and multidisciplinary programmes. The campus comprises 24,400m² of office space, small laboratories, training facilities and technical and IT support rooms. The two clean rooms at IMEC cover 8,400m² and are backed up by over 12,000m² of support infrastructure. Warehouse facilities cover 2,640m². An important part of this infrastructure is directed towards several pilot lines: for deep-sub-micron CMOS processing, for silicon solar cells and for prototypes of systems-in-package and heterogeneous systems-on-chip. A third cleanroom (300 mm) is under construction since 2009.

IMEC has teamed up with industry, universities, polytechnic schools, associated labs, and research institutes from all over the world since its establishment. IMEC cooperates now with more than 1,000 partners worldwide. Through innovative partnerships and agreements, IMEC's partners share in the results, expertise, and technological innovations. In Flanders, IMEC cooperates with partners from sectors such as ICT, textiles, metal, graphics, and healthcare. For these partners, IMEC supports process and product innovation through setting up technology communities, transferring technology to the partners, stimulating shared R&D, organising training and courses through the Microelectronics Training Centre, creating spin-off companies, collaborating with network organisations and knowledge partners (such as DSP Valley, Leuven Inc., IWT, Flemish Innovation Network, etc.).

IMEC actively supports the creation of spin-off companies, presenting opportunities for investors as well as for entrepreneurs. More than 20 spin-off companies have been set up to date in diverse sectors, such as photovoltaics (Photovoltech), EDA (CoWare), analog chip design (Ansem), satellite navigation (Septentrio), WSN/RTLS (Essensium) and infrared detectors (Xenics). In Flanders, and especially in the vicinity of IMEC, there is a (steadily growing) network of high-tech companies that are front-runners in ICT. In this way, IMEC is helping to develop Flanders into a unique knowledge region.

3.3.2.2

VIB: cutting-edge research in life sciences and biotechnology

VIB⁵⁵, the Flanders' Institute for Biotechnology, is a non-profit strategic research institute established in 1995. Its mission is to conduct frontline biomolecular research in life sciences for the benefit of society. The institute strives for excellence and international leadership in each of the following complementary activities:

55. www.vib.be

- Strategic basic research;
- An active technology transfer policy to bring inventions to consumers and patients;
- Scientific information for the general public.

Using advanced molecular biological technologies, the researchers study the functioning of human cells, plants and microorganisms. At VIB innovative fundamental knowledge is gained on normal and abnormal, or pathological, life processes. Strategic basic research is conducted in the various fields of life sciences such as molecular biology, cell biology, developmental biology, structural biology, systems biology, genetics, biochemistry, microbiology, genomics and proteomics. VIB's main objective is to understand the mechanisms that are responsible for normal growth and development (e.g. angiogenesis, apoptosis, plant growth and development, etc.) and diseases such as cancer, inflammation, neurodegeneration, haemophilia, etc.

VIB was established in 1995 at the initiative of the Flemish Government as an autonomous research institute, and developed in close partnership with four Flemish universities: UGent, K.U.Leuven, UA and VUB. Through this unique form of cooperation, VIB unites the forces of over 1,150 scientists and technicians, from across the world, in about 65 research groups with broad experience in life sciences. In 2009, the operating income of VIB was €62.5m. Research groups are embedded in the four partner universities and organised via eight departments. VIB also manages a biotechnology incubator in Leuven and in Ghent. In short, VIB is an international and intercultural community, gathering more than 45 nationalities within one institute.

In 2007 VIB research reached full speed with major breakthroughs in the field of cancer, immunology and inflammation, neurobiology and neurogenetics, angiogenesis and cardiovascular disease, plant biology and plant systems biology. These results contributed in gaining basic insights in to fundamental processes involved in growth and development, health and disease, life and death. In addition to excelling in life science research, VIB supports the establishment of new enterprises based on the knowledge generated in the institute through business planning, sourcing experienced managers to run start-up companies, and attracting international investors. VIB start-ups include: Devgen, CropDesign, Ablynx, Pronota, Solucel and ActoGeniX⁵⁶.

56. Spin-off companies: <http://www.devgen.com>; <http://www.cropdesign.com>; www.ablynx.com; www.pronota.com; www.solucel.com; www.actogenix.com

3.3.2.3

The Flemish Institute for Technological Research, VITO

VITO⁵⁷, established in 1991, conducts R&D relevant for industry and public authorities in the fields of environment, energy, materials and remote sensing. It stimulates the development of technological solutions and provides scientifically based advice and support for sustainable development. The overlapping fields of environment and health are also a priority for VITO since environmental quality is a key factor for determining health and well-being. Moreover, the institute has an established track record in providing economic and social information to policy-makers at Flemish, Belgian and EU level.

VITO differs from the other strategic research centres in Flanders because apart from research, it is also charged with executing tasks on behalf of the Flemish Government, including testing the quality of environmental and energy-related measurements and analysis that need to be conducted according to environmental regulations (known as reference tasks). It's annual operating budget of €73.5m in 2008, of which €26.7m from contract research, supports the work of some 480 employees.

Sustainability is a broad concept, hence the range of research carried out by VITO is very extensive. The scientific research focuses on: energy; quality of human environment; industrial innovation. It includes energy technology (renewable energy, biofuels, smart grids), environmental and process technology (reuse of waste water), research into sustainable materials and chemistry, environmental measurements (water and air quality), environmental toxicology and earth observation as integrated environmental studies. VITO works closely together with companies, governments, universities and other research institutions, both in Belgium and abroad. This leads to various common international research programmes, publications and communications at international conferences and symposia. At European level, VITO ranks among the top 10 in its research domains.

3.3.2.4

The Interdisciplinary Institute for Broadband Technology, IBBT

In today's world, ICT applications and infrastructure or data processing play a crucial role. To stimulate research and innovation in ICT and invest in multi-disciplinary broadband research, the Flemish Government set up IBBT⁵⁸, in 2004, as an independent research institute. In 2007, the budget of IBBT was €26.4m. The aim is to make Flanders a leading and internationally recognised player in the information society of the future. IBBT creates highly competent human capital in different aspects of ICT through multi-disciplinary demand-driven research. It executes such research for the Flemish business community and the Flemish Government.

57. www.vito.be

58. www.ibbt.be

This includes all technological, legal and social dimensions of the development and exploitation of broadband services.

The institute is a 'virtual' research facility, through which the services of other existing research groups can be accessed. While the central IBBT staff consists of only about 20 fulltime employees, the institute unites more than 600 researchers from various Flemish universities and knowledge centres. A research group is specialised in one or more of the basic competencies of IBBT, and can have a flexible composition depending on the evolving needs of companies and organisations. The institute has a large partner network, some of which are involved in determining the strategy of IBBT.

IBBT's work is based on demand-driven programming and the institute carries out contract research on technical and non-technical issues on behalf of individual companies, organisations or government departments. The institute is active at all levels in the innovation chain, from project concept to large-scale user testing and concentrates in particular on two different types of research activity:

- Interdisciplinary strategic basic research (ISBR): long-term research (joint project proposals with a horizon of three to five years) of an interdisciplinary nature;
- Interdisciplinary cooperative research (ICR): pre-competitive research which combines joint efforts of various stakeholders. ICR projects are result-oriented and usually require a demonstrator as 'proof of concept'.

The IBBT stimulates research that addresses main social and economic issues: e-Health, new media, mobility & logistics, enabling technologies, and e-Government. The institute also aims to help create a sustainable society by working on the social, environmental and economic aspects of ICT services and developing a green ICT strategy.

The IBBT possesses state-of-the-art laboratory facilities for the testing of prototypes, using the full range of broadband platforms. In essence, the IBBT has access to three complementary test centres operated by its research partners:

- iLab.o (open innovation): laboratory that sets up trial projects;
- iLab.t (technology centre): laboratory with infrastructure that can evaluate the technical feasibility, performance and service quality of an application;
- iLab.u (user experience and design): laboratory that tests the user-friendliness of the application and allows the reactions and experiences of future users to be measured.

It has also set up an incubation centre for ICT starter companies: iCubes.

IBBT has close links with regional ICT companies such as Alcatel Lucent, Barco,

Agfa, Televic, as well as with many other actors, e.g. the R&D division of the Flemish radio and television service, major organisations from the cultural sector, and agencies from the Flemish Government.

3.3.2.5

Centre for Medical Innovation, CMI

The CMI is a virtual research centre that specializes in translational biomedical research, the transfer of fundamental inventions with potential into clinical applications based on high-quality biobanks. Such research aims at faster and more efficient strategies for prevention, diagnosis and treatment of diseases. It is a research platform in which universities, (university) hospitals, scientific institutes, industry, and Flemish employers' and employees' organisations are represented. A biobank is a collection of all research data of research centres of the participating hospitals. Clinical Research Centres (CRCs) will be established, each linked to a Flemish university hospital (UZ Gent, Leuven, Brussel and Antwerpen). A first objective of the CMI is to harmonise and coordinate Flemish biobanks, including the alignment of these with federal and international initiatives.

The CMI will evolve into an autonomous inter-university structure that creates a stimulating environment for high-quality translational and biomedical research in Flanders. Translational biomedical research bridges applied-driven biomedical/clinical research on the one hand and the patient on the other hand. Thereby, knowledge diffusion is crucial in both directions: from the research laboratory to the patient and feedback from the patient for the clinical research.

3.3.2.6

Strategic Initiative on Materials, SIM

In 2009, the Flemish Government established the virtual strategic research centre SIM. Its aim is to conduct strategic and industrial research from universities and companies on materials technology in these research areas for:

- materials for energy and light;
- durable and sustainable structural materials;
- tailored nanomaterials in their environment (supportive nanotechnology).

The main ambition of SIM is to strengthen the economic position of the materials producing and materials processing industry in Flanders in the medium to long term. Research programmes and projects will be set-up based on open calls for proposals. SIM combines 10 major materials producing and materials processing companies (including Arcelor-Mittal, Bekaert, Recticel, Solvay, Umicore), the technology industry organisations Agoria Vlaanderen and Sirris, the Flemish universities and is supported by the Flemish Government through a special grant and the industrial R&D support programme of IWT. FLAMAC, an existing research platform

and one of the excellence centres, focusing on high throughput experimentation and molecular modelling, was integrated into the SIM.

3.3.3

Scientific institutes, research infrastructure and knowledge centres

3.3.3.1

Scientific institutes

In the Flemish Community, there are four scientific institutes, each managed by a department of the Flemish Government, that perform scientific research in a specific policy field. Apart from building-up and diffusing the knowledge gained from scientific research, the institutes also provide advice and assistance to policy-makers as well as services to society as a whole. Furthermore, they strive to develop and exchange their knowledge through international contacts or programmes and cooperation with other (foreign) institutes e.g. by membership of EU research networks.

The Institute for Agricultural and Fisheries Research (Instituut voor Landbouw en Visserijonderzoek ILVO)⁵⁹ is a scientific institute that reports to the Flemish Government's Agriculture and Fisheries department. ILVO's mission is to perform and coordinate policy-relevant scientific research and provides related services (including laboratory services) to policy-makers and professionals in agriculture, horticulture and fisheries. It aims to contribute to economically, ecologically and socially sustainable agriculture and fisheries. Based on research in the various scientific disciplines, ILVO acquires knowledge necessary for the improvement of products and production methods, for monitoring and safeguarding the quality and safety of end products, and for improving policy instruments as a basis for the development of the agricultural sector and policies relating to the countryside. The institute's research is subdivided into four units:

- Plant sciences (applied genetics and breeding, crop husbandry and environment, crop protection, growth and development);
- Animal sciences (functional animal nutrition, animal husbandry and welfare, fisheries);
- Technology & food science (agricultural engineering, food safety, product quality and innovation);
- Social sciences (integration, transition, open space): coordination of the organic farming and food research network, provision of agri-environmental indicators, etc.

59. www.ilvo.vlaanderen.be

The Research Institute for Nature and Forest (Instituut voor Natuur- en Bosonderzoek, INBO⁶⁰) conducts research on themes such as fauna, flora, biotopes, areas and regions, sustainable land and water use. Also it is involved in management and development and monitoring activities. For instance, the scientific research targets the typification of the physical and chemical environment of species and ecotopes, as well as the study of the impact of changing environmental conditions on them. INBO studies aspects such as ecohydrology, hydrology, eutrophication, acidification, pollution, fragmentation and climate change. The institute employs some 250 staff, mainly researchers and technicians and has branches, besides its main office in Brussels, in Geraardsbergen, Hoeilaart (Groenendaal) and Linkebeek.

The Royal museum of Fine Arts Antwerp (Koninklijk Museum voor Schone Kunsten Antwerpen, KMSKA)⁶¹ is charged with the care of a unique collection of expressive arts, composed of mainly Flemish artefacts and complemented with a number of pieces from other schools. The KMSKA holds a collection with pieces from the 13th to the 20th century with a comprehensive overview of art from Flanders as well as from abroad. The museum holds over 7,600 works of art and, on average, some 650 of these items are on display. The main task of the institute is to safeguard, expand and expose its collection, as well conduct scientific research on it. Moreover, it exhibits its collection and builds up services towards the public. It serves as a motor of culture in the Flemish museum landscape and based upon its extraordinary collection it can play an important role on the international arts scene. More specifically, the research division is responsible for art history studies and documentation of the KMSKA collection. In 2001, the museum began compiling a scientific digital inventory of its entire collection.

The main task of the Flemish Institute for Archaeological Heritage (Vlaams Instituut voor het Onroerend Erfgoed, VIOE⁶²) is to conduct policy-oriented research on immovable heritage in Flanders. The specialised researchers cover a wide variety of themes, e.g. human remains, redecoration of historic gardens, care for ancient trees, sea wrecks, etc. The VIOE manages three main inventory projects, which correspond with the main fields of heritage: archeology, monuments, and landscapes. Apart from these, the institute builds up and completes a number of smaller inventories: historic organs, parks and gardens, industrial heritage and maritime heritage. In 2007, it set up the 'research balance'⁶³ project to provide an overview of the knowledge, gaps, and current research issues regarding archaeological heritage in Flanders. VIOE has set up and manages other specific databases, e.g. on World War I heritage or on construction heritage.

60. www.inbo.be

61. www.kmska.be

62. www.vioe.be

63. www.onderzoeksbalans.be

3.3.3.2

Other institutes: ITM, VLIZ, MIP2, NERF

The Institute for Tropical Medicine (Instituut voor Tropische Geneeskunde, ITM⁶⁴) is one of the world's leading institutes for training, research and assistance in tropical medicine and health care in developing countries. Moreover, it provides (reference) clinical services for the management of tropical diseases, imported pathologies and AIDS in Belgium. Its core tasks in this area are:

- Clinical and preventive services for tropical diseases and related pathology;
- Advanced education in tropical human and veterinary medicine and in the management of health care in developing countries;
- Research on biomedical, clinical and operational aspects of tropical diseases and their control, and on the management of health care in developing countries;
- Supporting and strengthening national and international bodies concerned with human and animal health in developing countries

Its fields of activity include all health problems related to the specific ecological and socio-economic conditions of developing countries. Today it works globally with its partners towards a common goal of 'Health Care for All'. The ITM is an inter-university but autonomous post-graduate institute, divided into five scientific departments: microbiology, parasitology, animal health, clinical sciences, public health. ITM houses a specialist clinic for tropical diseases, travel medicine and HIV/AIDS with a hospital ward within the University Hospital of Antwerp (UZ Antwerpen). In total, the institute employs some 340 scientists, technicians and support personnel and has an annual budget of nearly €25m.

The Flemish Ministry of Education and Training is responsible for the academic recognition and core funding of the ITM. The institute carries out fundamental, applied and operational research on main and forgotten tropical diseases in humans (AIDS, tuberculosis, malaria, sleeping sickness, tropical ulcers, helminths, zoonosis) and cattle (trypanosomoses, theileriosis, helminths). It also carries out comprehensive research programmes on epidemiology, nutrition, and health systems and services development. The disciplines vary from molecular biology to social sciences, and are conducted in the laboratories in Antwerp as well as in the field. It closely collaborates with institutes and research groups all over the world and especially in the South. The ITM's research is strongly linked to its training, medical and technical support activities. On behalf of the Federal Directorate-General for Development Cooperation (DGDC), it carries out a wide-ranging international programme of capacity strengthening in the South. For the FPS of Public Health and Social Affairs it has the role of national reference centre for tropical diseases

64. www.itg.be

and as regional reference centre for the diagnosis and treatment of HIV/AIDS. It receives support from EWI to support Flanders' involvement in European and developing countries clinical trials partnership (EDCTP), and has set up a new clinical trial unit (CTU).

Flanders Marine Institute (Vlaams Instituut voor de Zee, VLIZ⁶⁵) is an autonomous non-profit institute in the field of marine science established with the support of the Flemish Government. Its strategic objectives are serving as an international contact point, promoting the international impact of Flemish research, and promoting the visibility of Flemish research to the public in its field.

To realise these strategic objectives the VLIZ focuses on the activities of the research vessel 'Zeeleeuw', managing and further developing the Flanders Marine Data and Information Centre (VMDC), managing a multimedia centre with a large collection on marine scientific and coast-related information, promoting a network of marine scientists, and assuming the role of information desk. In 2008, in total 238 days were spent at sea for scientific research purposes. The VLIZ also contributes to (inter)national planning, management and efficient use of marine research infrastructure. The VMDC is an integral part of international networks (IOC of UNESCO, OBIS, ESF Marine Board, MarinERA, EurOcean and other European networks) and contributes to the development of international standards for managing and exchanging data and information. Thanks to the conclusion of cooperation agreements, the VLIZ further extends cooperation with Belgian and foreign universities, research institutes and individual research groups.

VLIZ has a special responsibility in international marine science as it accommodates and supports the UNESCO/IOC Project Office for IODE, located at the Ostend fish auction hall. This office hosts 105 dynamic websites across 12 servers (inclusive of virtual machines). In addition, VLIZ spends half a million euro every year on the support of training courses for foreign students and experts in oceanographic data management with special attention to the development and operation of early tsunami warning systems and other ocean-related natural disasters.

VLIZ also organises events on marine sciences. An example is the EurOCEAN 2010 Conference (one of the Belgian EU Presidency events), a unique opportunity for the European marine science community to highlight new challenges for marine research in the next decade and to discuss policy developments since the previous EurOCEAN conference in Aberdeen, Scotland, in 2007.

65. www.vliz.be

The environment and energy technology innovation platform (Milieu- en energietechnologie Innovatie Platform 2, MIP2⁶⁶) was established by the Flemish Government in 2005 with a focus on the development of new energy and environment technologies. In 2009, the mission of the platform was altered, and it was renamed MIP2 with as a main task the ‘greening’ of the economy. MIP2 encourages companies to invest in new products, processes and services that limit the impact on the environment. MIP2 thereby aims at closing materials- and process loops according to the ‘Cradle-to-Cradle’ philosophy as well as at the development of new technologies for smart energy production. MIP2 supports the transition to a new economy in which consumption and economy are decoupled from the ecological impact on our planet. The platform has two support programmes: establishing and implementing R&D projects, and establishing sustainable product and process cycles.

Recent developments in research and innovation require cooperation networks spanning different scientific areas, in particular life sciences or ICT applications. The Flemish Government decided, therefore, in 2009 to support such strategic multidisciplinary cooperation initiative, mainly in the biotechnology and nanotechnology fields. The NERF (Neuro-Electronics Research Flanders)⁶⁷ initiative is a co-operation on an equal basis between IMEC, VIB and the K.U.Leuven. Researchers will conduct world-class research in cross-disciplinary teams in a state-of-the-art clean room and a new 1,000m² neurolab, located at IMEC’s Arenberg Campus in Leuven.

3.3.4

Internationalisation of Flemish research and innovation

3.3.4.1

Flanders’ participation in EU programmes

The EWI department has undertaken a quantitative analysis, both at a broad level and at the level of the specific programmes, to measure the Flemish performance in the EU’s FP6, which ran from 2002 until 2006. In general, 422 Flemish institutions participated 1,342 times in 1,051 FP6 projects, generating a total budget of €352.29m. This corresponds to a financial return of 2.12%, implying that Flanders nearly matched its expected return from FP6 ($\pm 2.2\%$). Indeed, the budget received and the return for Flemish participants were both more than double the figures achieved by participants from other parts of Belgium. The same is true for the participation in ERA—nets where Flemish partners were involved in 24 networks. The table below shows the evolution of the relative participation of different categories:

66. www.mipvlaanderen.be

67. www.nerf.be

FIGURE 21 Flemish participation to EU FP – share by type of organisation

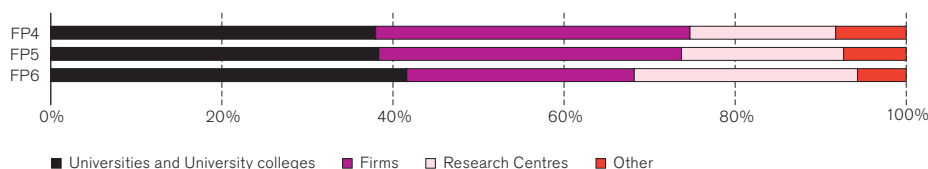


FIGURE 22 Flemish participation in FP6

ACRONYM	NUMBER OF PARTICIPATIONS	%	NUMBER OF PROJECTS	FINANCIAL CONTRIBUTION (2)	%	RETURN (3)
LIFESCIHEALTH	137	10%	107	53.86	15%	2.30%
IST	291	22%	213	106.04	30%	2.80%
NMP	123	9%	82	36.69	10%	2.39%
AEROSPACE	44	3%	39	10.47	3%	0.98%
FOOD	67	5%	49	15.85	4%	2.11%
SUSTDEV	140	10%	99	30.04	9%	1.31%
CITIZENS	40	3%	35	4.84	1%	1.98%
SME	60	4%	48	6.45	2%	1.33%
SSP	85	6%	72	10.63	3%	1.77%
INCO	35	3%	34	9.27	3%	3.05%
POLICIES	5	0%	4	0.47	0%	3.41%
COORDINATION	25	2%	25	3.59	1%	1.25%
MOBILITY	165	12%	147	33.85	10%	2.01%
INNOVATION	27	2%	21	4.47	1%	1.98%
INFRASTRUCTURES	23	2%	19	12.63	4%	1.74%
SOCIETY	23	2%	18	1.81	1%	2.32%
EURATOM (EXCLUDING FUSION)	52	4%	39	11.34	3%	6.11%
TOTAL	1,342	100%	1,051	352.29	100%	2.12%

(1) INTAS funding excluded.

(2) In million euro.

(3) Relative share of the Flemish budget in FP6 compared with the total budget allocated for contract research within FP6 (INTAS funding excluded).

End 2008, the Flemish Government approved the participation of IWT in the European Joint Technology Initiatives ARTEMIS and ENIAC, and in the joint programmes EUROSTARS and Ambient Assisted Living (AAL). The other initiatives such as on innovative medicines (IMI) or on fuel cells and hydrogen are being followed up.

In the framework of the ESFRI, a direct Flemish involvement (via universities, IMEC, INBO, VLIZ, etc.) in the preparatory phase took place for six projects: PRINS (Pan-European Research Infrastructure for Nano-Structures), CLARIN (language and speech technology), LIFEWATCH (biodiversity), ICOS (Integrated Carbon Observation System); ESS (European Social Survey) and SHARE (Survey of Health, Ageing and Retirement in Europe).

IWT has opened up its support programmes for companies for international (innovative) cooperation. The number of projects in which Flemish companies work with a foreign research group, or in which Flemish research groups have formed a consortium with foreign groups is increasing and reached over 50 by end 2007. The total budget of these projects was €45m, of which €15m went to foreign partners; half was supported by the government and half by the companies in Flanders.

Flanders is active in the EUREKA networks for which IWT provides support for participants from Flanders through its R&D business support programme and its SME Programme. Over a dozen projects were supported in 2008.

3.3.4.2

Bilateral cooperation between Flanders and the Netherlands

A special relationship in international research and innovation cooperation exists between Flanders and the Netherlands. Sharing the (political) vision and the ambition to become (and stay) one of the most competitive and innovative regions in the world, both Flanders and the Netherlands are fully aware of the need to join forces in fulfilling this ambition. The cooperation takes place in various forms: on an official basis through treaties or agreements, through mutual policy-learning initiatives, by jointly run initiatives based on a common Flemish-Dutch budget, or within the framework of EU programmes (e.g. FP or ERDF funding).

In 2004, Flanders and the Netherlands signed a joint declaration of intent for (further) strengthening strategic cooperation in the field of innovation. On 17 April 2008, this declaration of intent was renewed, broadening the scope with the policy areas of 'economy' and 'science'. These declarations of intent provide a 'formal framework' to join forces in the most efficient and effective way, so that obstacles for cross-border cooperation in the field of economy, science and innovation can be smoothed out. Among other ways, this is achieved by the establishment of a permanent Flemish/Dutch 'task force', regular meetings between the involved ministers, stimulating cross-border networking and cooperation between all stakeholders involved, agreements on joint policy positions within the framework of European and international forums and programmes, or stimulating and supporting (joint) participation by Flemish and Dutch stakeholders in such programmes (e.g. FP7, the ESFRI, the EIT's Knowledge and Innovation Communities (KICs), etc.).

Facilitating and establishing ‘tangible’ cross-border initiatives in a number of specific research and technology areas is also a goal. Dutch knowledge vouchers can be used by Flemish companies, while Flanders will develop a system to allow use of its vouchers by Dutch companies (reciprocity principle).

Joint initiatives realised within the framework of the Flemish-Dutch task force are the further thematic expansion and realisation of the ELAt (see **BOX 19**), the elaboration of joint participation within the established KICs of the EIT, thematic cooperation in the fields of bio-based economy (e.g. within the BioBase Europe initiative), (green) energy technology (focussing on photovoltaics), food and nutrition, human language technology (also within the ESFRI project Common Language Resources and Technology Infrastructure – CLARIN), marine science technology (focussing on joint initiatives for an integrated coastal zone management and marine spatial planning) and water technology (focussing on hydro energy).

Other successful cases are the Holst Centre of IMEC and TNO or the STEVIN programme on language technology. The Holst Centre⁶⁸ was established in 2005, as a combined effort between Flanders (IMEC, Flemish Government) and the Netherlands (TNO, Philips, Ministry for Economic Affairs). It acts as the bridge between the knowledge centres and industry and aims to develop into an internationally recognised research institute for future generations of autonomous wireless sensor networks and thin foil electronics. Leading companies have joined the initiative. IMEC has contributed its research division, which works on autonomous wireless microsystems. Amongst other aims, the project entails producing sensors that measure bodily functions. The research also focuses on ultra-low power data transmission, WATS (Wireless Autonomous Transducer Solutions) and SIF: Systems-in-Foil. The centre is involved in over 16 academic partnerships and has grown into an organisation with around 100 employees from 18 countries and some 60 partners from participating companies and universities.

STEVIN⁶⁹, a Dutch acronym for ‘Essential Speech and Language Technology Resources for Dutch’, is a six-year joint Flemish-Dutch research programme launched in 2005. Its aim is to contribute to the further progress of human language technology for Dutch in Flanders and the Netherlands, and to stimulate innovation in this sector. In addition, it strengthens the economic and cultural position of the Dutch language in the modern ICT-based society. It is a jointly financed programme based on a ‘common pot’ budget (1/3 Flanders, 2/3 the Netherlands): each side contributes an amount to the total budget allocated through public calls, without a pre-determined distribution key.

68. www.holstcentre.com

69. www.stevin-tst.org

In 2009, two major projects on renewable energy were set-up, that involve EU funding through the Interreg IVA programme Vlaanderen-Nederland 2007-2013. The 'Bio Base Europe' projects (with a total value of €21m) aims to build a polyvalent facility on industrial biotechnology and bio-refinery in Ghent (Flanders) and a training centre for process operators in Terneuzen (the Netherlands). The BioBase Europe initiative is the first of its kind in Europe and will become the first open innovation and training centre on bio-based economy. Also, the 'Waterstofregio Vlaanderen – Zuid-Nederland' (Hydrogen region Flanders – South-Netherlands) aims to establish a cross-border region on hydrogen applications; it involves in total €16m over four years).

The evaluation of the participation of Flanders in the EU's FP6 underlined that Dutch researchers, mainly from universities and university colleges, were important cooperation partners of Flemish institutes. More specifically, the Netherlands participated 1,157 times in FP6 projects in which Flanders also took part (accounting for a total funding of €326m), making them the fifth most important partners, after the three large EU countries and Italy. Conversely, Flanders participated 777 times in FP6 projects in which Dutch partners also participated, accounting for a total funding of €202m. Major Dutch partners were TU Delft, Philips Electronics Nederland BV (Eindhoven), RIVM (Bilthoven) and SN (the Hague). Flanders and the Netherlands are also jointly involved in a number of EUREKA projects for market oriented industrial R&D; for instance, the EUREKA-clusters ITEA, MEDEA+, EUROFOREST and CELTIC.

BOX 19 A top knowledge economy based in three countries: ELAt

ELAt – the geographical triangle shaped by the Eindhoven (NL) - Leuven (BE) - Aachen (DE) region – contains major research and innovation institutes and activities on an area of about 14,000 km². The ELAt triangle is integrated into the global network of more advanced knowledge economies, thanks to its dense network of over 20 knowledge institutions, universities, university colleges and research centres, as well as

various science parks and incubators. The region scores highly in world rankings for design, manufacturing, R&D, marketing and distribution, and disposes of capital, from seed money to risk capital. A combination of all of these strengths in one region is hard to find. The actors in the triangle per entity include:

→ Flanders: K.U.Leuven, UHasselt, IMEC, VITO,

Flanders' Drive, Leuven DSP Valley;

→ The Netherlands: Eindhoven University of Technology, Maastricht University, Tilburg University, Philips Laboratories, Holst Centre;
→ Germany: RWTH Aachen University, AGIT, Jülich Research Centre.

See: www.elat.org

3.4

Perspectives for the Flemish STI policy

In 2006, based on a SWOT analysis, the VRWI defined a number of key areas for Flanders, linked to future (societal) evolutions by way of six strategic clusters. These were later developed into 10 spearheads for technology and innovation and further developed into action plans. A large part of the themes of these clusters and spearheads served as an impetus for and are promoted by the ViA and related Pact 2020 initiatives of the Flemish Government. While these strategies were developed before the Europe 2020 strategy was presented, they correspond to a large extent with the overall Europe 2020 Strategy aims and are regarded as crucial for the socio-economic policy and well-being of Flanders in the second decade of the century. Examples of specifically defined targets are the 3% R&D to GDP expenditure target, the increase year-by-year of the number of patent applications, or the aim to be in the EU's top-5 of regions for public expenditures on eco-innovation. All these goals are part of the strategic objective of accelerating the transformation of the economy.

At the EU policy-making level, these issues of a global importance and of a specifically research/innovation-related kind are being dealt with mainly in the new 'EU 2020 strategy', the Commission's forthcoming Research and Innovation Action Plan, and the pursuit of the ERA. For all of these topics, the Flemish Government has contributed to various EU consultations from different EU institutions (Council, Commission, Committee of the Regions)⁷⁰. Regarding the Europe 2020 Strategy ('Flagship Innovation-Union') and the Commission's Research and Innovation Action Plan, the Flemish Government's point of view is:

1. To welcome the considerable importance given to innovation in the Europe 2020 strategy, and to underline a threefold role for innovation:
 - A. Helping to find an answer to the major societal challenges such as the transformation to a more knowledge-driven, low carbon and closed loop economy, climate change, loss of biodiversity, energy supply and aging;
 - B. Further strengthen the international competitiveness position;
 - C. Fine-tuning within the framework of Europe 2020 on the targets of the establishment of a sustainable societal and economic fabric, and support these regarding social inclusion and sustainability.

To this end, the instruments for innovation and research must further be adapted to better match and serve all of these purposes and targets. At the same time, innovation must be further integrated within government organisations

70. See <http://www.vlaandereninactie.be/nlapps/docs/default.asp?id=571> (in Dutch).

and elaborated horizontally. Also, 'open innovation' must be promoted within the overall governance structures of the ERA.

2. A better linkage should be made between the innovation and the research targets than has been the case until now;
3. The commonly applied input-indicator of 3% (Barcelona target) alone is too general to cover the whole field of R&D and innovation. In this specific area, there is a need for a realistic set of input, throughput and output-outcome indicators;
4. Flanders notes with satisfaction the Commission's shift to approaching 'innovation' from broad societal tendencies and challenges, not only the technology and research aspect. Yet there remains a need to create links with the other pillars of the Europe 2020 strategy and more specifically with innovation in the general sense. The anticipation on social inclusion, training, greening of the economy and sustainability requires not only technological innovation, but also the development of innovative applications in other areas such as the social economy, the creative and leisure industries, culture, media, etc.. Hence, there is a need to support process oriented transitions to sustainable production and consumption patterns;
5. Regarding a competitive and greener economy, the emphasis should be put on the link between innovation and industrial policy, as this is important in view of the restructuring of industry and the transformation to a low carbon and recycling economy;
6. Concerning the added value of knowledge as the basis of growth, favourable conditions must be created to diffuse innovation to all sectors and policy fields. Innovation should in this regard also be driven by societal challenges and needs ('societal driven innovation'). This includes a reorientation of research activities to strategic domains;
7. Education is one of the three corners of the knowledge triangle. It is important to foster the transition to innovation through knowledge.

Regarding the ERA, this remains high on the agenda in Flemish international policy. The Flemish Community is fully engaged in helping to realise the ERA; playing an active role, both in terms of attracting foreign researchers and sending its own research personnel abroad, in the development of an open international research community, within which researchers can move freely from place to place, thereby promoting the efficient exchange of knowledge.

In the beginning of March 2010 the Flemish action plan for researchers was published, in response to the European partnership for researchers proposed by the European Commission. Some actions are already under way, such as inciting research organisations to adopt a human resource strategy as a way of implementing the Char-

ter and Code, or an inter-university workgroup, which is developing a proposal for an accurate and objective evaluation of aspiring candidates from Flanders and abroad.

At the same time, the high quality of Flemish universities and research institutions is a clear asset for Flanders in the international scene. As a supplement to the usual bottom-up approach to research and innovation, a cluster approach has been developed. Also, more emphasis is put on strategic innovation. Initiatives such as joint programming and the EIT, with its KICs, are considered good answers to novel challenges that can only be tackled with joint forces and with respect for the contributions that each angle of the Knowledge Triangle brings. International cooperation should thus be strengthened by inter-sector collaboration. While Flanders is already involved in EIT, notably in the KIC InnoEnergy (on sustainable energy), a more structural approach is called for that will provide Flemish research organisations and companies with the necessary funding to fully participate in these initiatives. At the moment strategies are being developed by the Flemish government to facilitate participation in joint programming and KICS.

To develop world-class research infrastructure, Flanders is an active participant in the ESFRI scheme. An advisory commission was set up, which prepared a priority list of projects in which to participate. At the moment, steps are being taken to ensure Flemish participation in the shortlisted projects, through intra-Belgian consultation, positioning regarding contents and legal matters and securing the necessary funding.



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4. STI POLICY IN WALLONIA AND IN THE FRENCH COMMUNITY

In constitutional terms, the Walloon Region and the French Community are distinct entities and therefore have their own government and administrations, however, with each progressive constitutional reform co-operation has become more intense. Since 2009, a single Minister-President presides the two governments and several other Ministers have portfolios for both regional and community affairs. The avowed aim is to improve the level of coherence of government action in a series of policy fields. This is, notably, the case for scientific research which is the responsibility of a single minister for both regional and community aspects. Similarly, the Minister in charge of higher education at community level is also responsible for business support and ICT policy at regional level. Other individual ministers, from either government, are autonomously responsible for funding research in their specific fields of competence such as agriculture, environment, energy and health. In practice, there is a high-degree of co-ordination of STI policy within the government, and cross-departmentally at administration level, to ensure a coherent use of public funds.

4.1

General orientations of STI policy in Wallonia and in the French Community

Following the regional elections of June 2009, the formation of the Walloon and French Community governments was based on a common political strategy. The socio-economic priorities of this strategy have been translated into an operational plan called the Marshall Plan_{2.Green}⁷¹ (Plan Marshall_{2.Vert}). This plan is a continuation and a reinforcement of the previous plan, adopted in 2005 and implemented during the period 2006-2009. The addition of 'Green' underlines the new orientations to better integrate 'sustainable development' as a cross-cutting priority.

The first Walloon 'Marshall Plan' focussed an additional budgetary appropriation of €1b on five priorities: the development of five competitiveness clusters, the stimulation of the creation of activities, the reduction of taxation on business, the reinforcement of research and innovation support, vocational training and mobil-

71. The use of the term 'Marshall Plan' (a direct nod to the post-second World War economic recovery package) was adopted by the Walloon authorities to underline the need for a significant re-launch and new direction of the Walloon economy.

ity of workers. The Marshall Plan-2.Green will invest a further €1.6b over five years (2009-2014) to the following six priorities:

- Priority area 1: Develop human capital
- Priority area 2: Continue the policy of competitiveness poles and business networks
- Priority area 3: Strengthen scientific research as an engine of the future
- Priority area 4: Create a favourable framework for creating business and quality jobs
- Priority area 5: Develop ‘Employment – Environment’ alliances
- Priority area 6: Increase employment and infrastructure in the sector of personal services

The third priority area of the new plan incorporates the main actions to be pursued during the 2009-2014 period as regards STI policy. The Walloon and French Community authorities are planning to sustain the trend of (re)investment in research and innovation, which began in 2005. These efforts are designed to meet the target set within the framework of the Lisbon European Council, and reiterated in the European Commission’s Europe 2020 strategy, to invest at least to 3% of GDP in R&D.

Funds from both authorities will be invested in the implementation of a joint research strategy, which also involves the Brussels-Capital Region, and focuses on strategic cross-cutting themes. Additionally, both authorities intend to pursue the efforts undertaken since 2005, namely:

- Reinforcing investment in basic research by the French community through the implementation of the second development plan of the National Scientific Research Fund (FRS-FNRS).
- The continuation of STI programmes started within the first Walloon Marshall Plan: programmes of excellence, mobilising programmes, support of research projects of competitiveness poles, research commercialisation through the creation of spin-offs.
- A continued support to partnerships between university academies and between research actors and industry.

Both authorities also intend to work together to:

- offer an attractive career to researchers;
- better integrate French-speaking researchers in international networks;
- reinforce activities for science awareness in order to encourage young people to pursue scientific and technical careers;
- implement a technology assessment process as a tool for decision-making in various areas of public action.

The integration of research in business innovation strategies is a Walloon priority, also continued through the new Marshall Plan, mainly via:

- Measures to improve support for spin-offs,
- Calls for specific projects dedicated to technological innovation partnerships; with a view to encourage co-operation between companies and between research institutions and industry, inside and outside the framework of competitiveness poles.
- Support to ‘proof of concept’ strategies via the dedicated teams within universities supporting research commercialisation and via technology incubators.
- Definition of an integrated strategic plan to stimulate business innovation, particularly innovations with environmental benefits.

Other measures, forming part of the priority areas 2 and 6 of the Marshall Plan₂. Green aim at supporting research and innovation in the specific field of the environment with the creation of a 6th competitiveness cluster dedicated to ‘green’ technologies, the creation of a centre of excellence in the field of sustainable development and funding of research programmes in areas such as renewable energy, sustainable construction and smart technologies for the management of the electricity network.

4.2

Actors and instruments of STI policy in Wallonia and in the French Community

4.2.1

Policy advice

4.2.1.1

CWPS – Walloon Science Policy Council

The CWPS (Conseil Wallon de la Politique Scientifique⁷²) is in charge of providing advice to the Walloon Government on STI policy matters. The council is composed of representatives of the social partners (business and trade union leaders), of universities and higher education institutions, of accredited collective research centres and of the Walloon Government. The Council delivers its opinions both on request and on own initiative. The CWPS is one commission of the Walloon Economic and

72. <http://www.cesrw.be/index.php?page=detail&alias=Conseil-de-la-Politique-scientifique-CPS>

Social Council (CESRW), and its mission is therefore in line with the overall mission of this key advisory body. The CESRW, often described as the ‘Social Parliament’ of the Walloon Region, has as a mission to issue advisory opinions and recommendations about all matters that come within the region’s sphere of influence, and those making an impact on the economic and social sectors in Wallonia in order to create a social dialogue, and to organise consultations between the Walloon social partners and the Government.

From a legal perspective, both the French Community and the Walloon Region have a science policy council. In practice, the CWPS provides opinion on all issues related to STI policy for matters pertaining to the competencies of both authorities. The CWPS focuses its work on both STI budgetary issues as well as seeking to identify synergies between the actions of the regional and the community authorities, and between basic and applied research and innovation. The broad based membership of the CWPS, drawn from the various spheres of the regional innovation system, facilitates the focus on an effective policy mix for STI encouraging such synergies.

Key activities of the CWPS include:

1. issuing advisory opinions and recommendations about research and innovation policy, and all related matters;
2. conducting surveys and being associated with analyses on research issues in Wallonia to support its work;
3. organising consultations between representatives of universities, research and innovation actors, the business sector and the Government so as to make progress on a series of issues of key importance for the development of Wallonia as a knowledge economy.

4.2.1.2

Council of Rectors of the French Community – CReF

The CReF (Conseil des Recteurs de la Communauté Française) is an advisory council on matters related to basic research as well as on third-level education in the French-speaking universities of Belgium. It issues opinions on EU (Bologna process, European Commission communications, etc.) and on French Community research policy. It can also mandate working groups on specific issues (such as the implementation of the recommendation on the European Charter for Researchers). It is a key player in research and education policy and as such, the General Secretary of the FRS-FNRS provides a secretariat for the CReF.

FIGURE 23 Structure of the French Community and the Walloon Region

	FRENCH COMMUNITY	LINKING ELEMENTS	WALLOON REGION
PARLIAMENT	Parliament of the French Community the 75 deputies of the Walloon Parliament and 19 deputies from the Parliament of the Brussels-Capital Region	75 Walloon deputies are part of the Parliament of the French Community	Walloon Parliament: 75 deputies
GOVERNMENT	Government of the French Community: 1 Minister-President 3 Vice-Minister-Presidents 3 Ministers	Common Minister - President 3 common vice minister-presidents for public service, budget and finance and research portfolios	Walloon Government: 1 Minister-President 3 Vice-Minister-Presidents 4 Ministers
ADMINISTRATION	Ministry of the French Community		Walloon Public Service
	Secretary General		Secretary General
	5 General Administrations (GA) GA Infrastructure GA Youth & Sport GA Educational staff GA Culture GA Education and Scientific Research → DGENORS		2 Transversal Directorate Generals DGT1: Staff & General Affairs DGT2: Budget, logistics & ICT 7 Operational DGs DGO1 : Roads & buildings DGO2 : Mobility and waterways DGO3: Agriculture, natural resources & environment DGO4: Land use, cultural heritage and energy DGO5: Local authorities, social affairs and health DGO6: Economy, Employment & Research DGO7 : Taxation

The CRef also manages a central database on research units and associated research projects that it makes available for consultation. The database, updated annually, includes statistics on student and scientific, teaching, administrative, technical, and management numbers for the universities of the French Community.

4.2.1.3

The Inter-university Council of the French Community (CIUF)

The CIUF (Conseil Interuniversitaire de la Communauté Française)⁷³ is a public interest organisation bringing together all the universities of the French Community. Its main missions are to issue opinions on matters relating to university education, to organise consultations on these matters, to foster collaborations between universities, and to represent academic institutions in various national and international organisations.

4.2.2

Government departments

In Wallonia and the French Community, the government departments responsible for the design and implementation of STI policy are, respectively:

- the DG for Economy, Employment and Research (DGO6) of the Walloon Public Service (WPS), which manages all measures and initiatives in favour of industrial research, and experimental development of innovative products, processes and services; including project selection, funding and monitoring. The DGO6 also manages policy initiatives in favour of enterprises networks, non-technological innovation and the follow-up of international, mainly EU, policy targets for research and innovation.
- the Directorate-General for non-obligatory education and scientific research (DGENORS), of the French Community, is responsible for funding universities and other higher education institutions (HEI) and for non-targeted scientific research (through the FRS-FNRS and the associated funds).

4.2.2.1

Directorate General for Economy, Employment and Research (WPS) (DGO6)

Since 1 August 2008, the WPS brings together in a single entity the two departments that previously made up the Walloon administration, i.e. the Ministry of the Walloon Region (MRW) and the Ministry of Equipment and Transport (MET). In addition to the Secretary General and two horizontal directorates dealing with matters common to all services (legal issues, budget, human resources, translation, logistics or IT), seven operational directorates (DGO) were established. In particular, the former Directorate General for Technologies, Research and Energy (DGTRE) and the Directorate General for Economy and Employment

73. www.ciuf.be/cms

(DGEE) were merged to become the DGO6 (Direction Générale Opérationnelle de l'Economie, de l'Emploi et de la Recherche). The DGO6 is the key policy-design and implementing body for research and innovation policy at regional level. As regards innovation policy, the DGTRE used to deal with industrial R&D support and the DGEE with industrial policy (competitiveness poles and clusters policies) and non-technological innovation support. The merger should create a more coherent system and a more coordinated regional research and innovation policy.

FIGURE 24 Government budgetary appropriations on R&D (in thousands €)

2003	2004	2005	2006	2007	2008	2009i
172.152	139.713	169.709	200.019	257.162	332.113	330.982

Source: WPS DG06

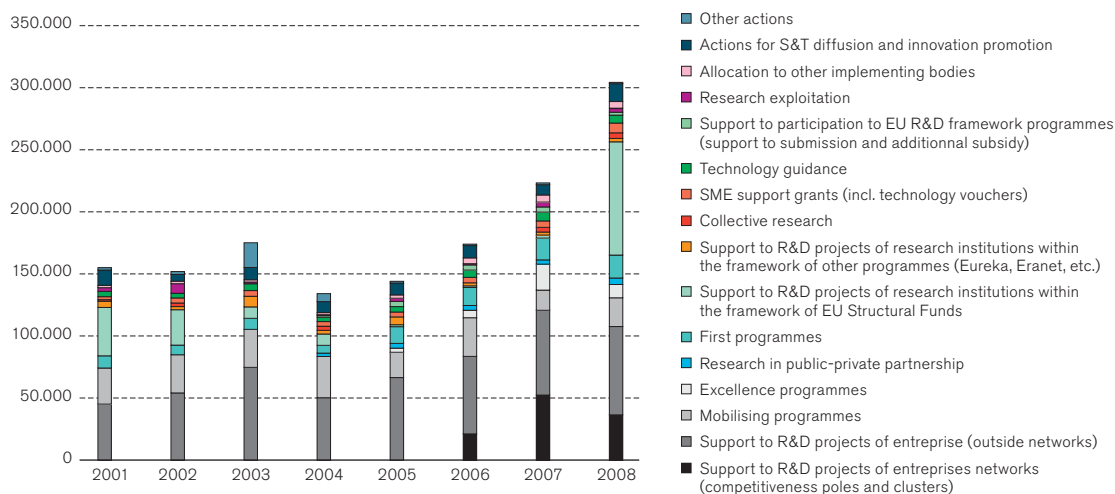
In Wallonia, budget appropriations for R&D were just over 4% of total public expenditure in 2009. The DGO6 budget for R&D support represents over 80% of the total regional GBAORD; the remainder is allocated to specific actions in fields such as energy, agriculture, environment and natural resources, employment and training, land use and town planning. Between 2005 and 2008, Walloon budget appropriations for R&D have increased significantly (by nearly 95%). In 2009, on the basis of the initial budgetary credits, the budget allocations for R&D stabilised in comparison to 2008.

FIGURE 25 Budget appropriations for R&D of DGO6 per funding source (in thousand €)

ADJUSTED BUDGET, THOUSANDS €	2005	2006	2007	2008
Ordinary credits	120.515	130.452	138.344	149.208
Cofinancing Structural Funds	13.170	1.106	2.909	93.811
Priority Action Plan (Marshall Plan)		33.267	72.153	51.344
TOTAL BUDGET APPROPRIATIONS	133.684	164.825	213.407	294.363

Source: WPS DG06

FIGURE 26 R&D budget appropriations of the Walloon Region by type of programme, 2001-08, (in thousand €)

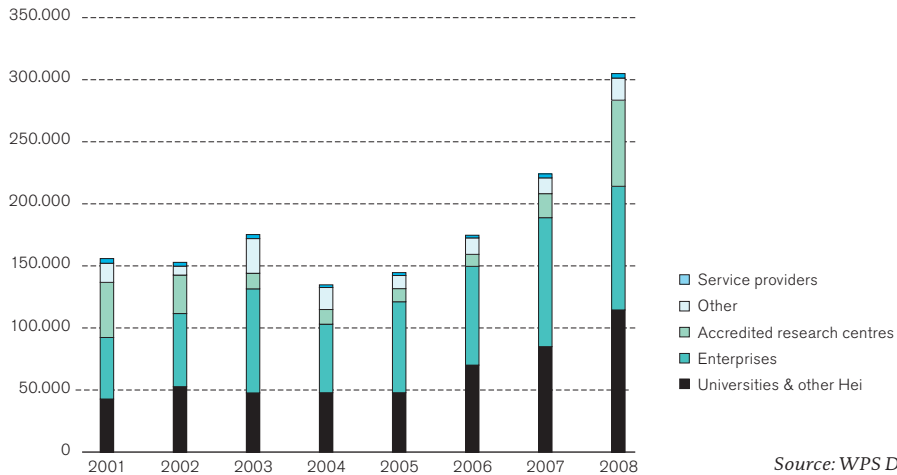


Source: WPS DG06

In the field of R&D support, a new legal basis was adopted by the Walloon Government in July 2008, implementing the rules of the European State Aid R&D and innovation framework. The decree allows the Walloon Region to allocate funds to four broad categories of actors: 1) universities and other higher education institutions for industrial research projects relevant for regional socio-economic development; 2) accredited research centres, for applied research and technology diffusion activities for regional companies 3) innovative companies, for R&D and innovation projects 4) technological innovation partnership (PIT, a consortium of companies and research institutions). The funds are allocated via a set of programmes targeting these actors. As a general rule, industrial research projects are funded by grants, whilst experimental development projects are funded by reimbursable loans. Universities and related institutions benefit from a 100% rate and accredited research centres a 75% rate. For companies, the rate varies according to the size of the company: between 50 and 80% for a grant and between 40 and 60% for a reimbursable loan. Young innovative enterprises and partnership projects (consortium of companies or in a PIT context) benefit for higher rates and the possibility to choice between a grant or a loan.

A set of aids specifically dedicated to SME's are available to help enterprises to define their innovation strategy, study the feasibility of their project on a technical and/or commercial field or to register a patent.

FIGURE 27 R&D budget appropriations of the Walloon Region by type of beneficiary, 2001-2008 (thousand €)



Source: WPS DG06

In the field of industrial policy, the DGO6 provides support to clusters and co-ordinates the competitiveness poles support measure (see point 4.2.5.4). It provides support to SME development helping them to benefit from accredited consultant services, implement quality management or begin an e-business. It collaborates with the Economic Stimulation Agency (ASE) and the Walloon SME financing Agency (Sowalfin) to offer to companies a coherent set of support services.

BOX 20 Promoting participation in EU programmes

The Walloon Region has developed various tools to maximise the participation of research actors to EU research programmes. The NCP-Wallonia is managed by the Walloon Business Federation (Union Wallonne des Entreprises, UWE) with the mission to promote the participation of regional actors in EU Programmes (FP7, CIP, ERAnets, EUREKA, etc.). It provides information and assistance to identify research partners and for the planning and administrative management of research projects.

Horizon Europe, a regional support measure, awards grants to cover the costs incurred to prepare, submit and negotiate a research project to FP7 calls for proposals, as well as for EUREKA. Under FP6, accredited research centres and companies, could receive top-up funding from the Walloon Region when projects were selected. This additional funding represented 25% of the budget accepted by the EU.

The Walloon Region also participates to the EEN (Enterprise Europe Network) implemented through the CIP2007-2013 to help enterprises to benefit from transnational partnerships opportunities. The Walloon part of the network is composed of 10 local development agencies, one of which acts as a co-ordinator.

FIGURE 28 Amounts awarded for Horizon-Europe, per category of actor, in thousand €.

BENEFICIARY	2005	2006	2007	2008
Centres	80	446	90	154
Enterprises	424	379	200	324
Universities/HEI	539	583	82	350
TOTAL	1.044	1.408	372	828

Source: WPS DG06

DGO6 represents the region in the committees over-seeing several European initiatives managed by DG Enterprises and DG Research of the Commission and ensures the follow-up of these programmes.

FIGURE 29 Additional funding allocated by the Walloon Region to accredited research centres and companies for participation in FP6

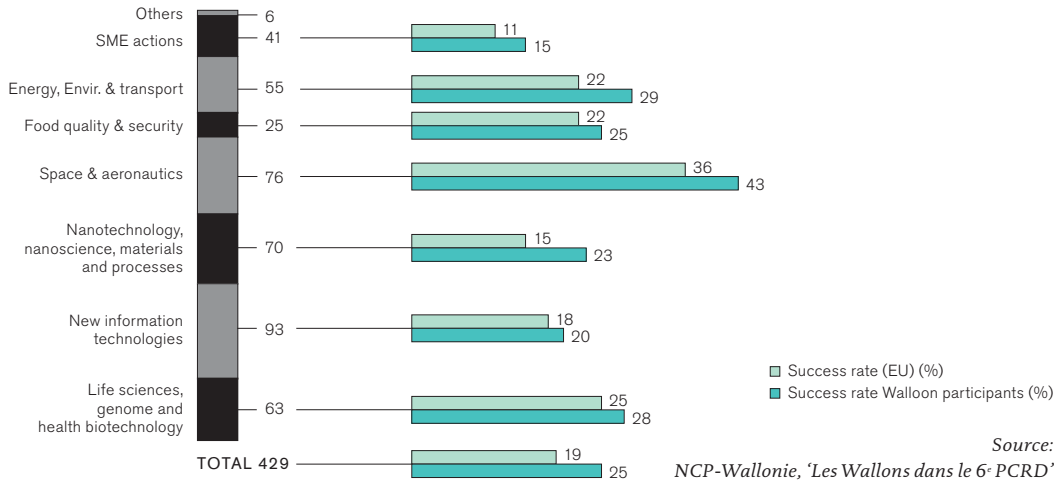
BENEFICIARY	2005		2006		2007		2008	
	#	BUDGET	#	BUDGET	#	BUDGET	#	BUDGET
Centres	15	1.836	13	1.187	14	1.703	5	468
Enterprises	13	1.247	21	1.887	20	2.200	5	446
TOTAL	28	3.083	34	3.074	34	3.903	10	913

Source: WPS DG06

A review of Walloon participation in FP6 by the NCP-Wallonia⁷⁴ has highlighted that the region has greatly increased its involvement in the programme, both in terms of quantity and quality. Walloon actors participated to 1236 projects applications from which 324 projects were selected for funding; including 39 led by a Walloon organisation. A number of Walloon actors have taken part in several projects, so that, in total, Wallonia registered 429 supported participations, or just over a quarter of Belgian participations. One proposal out of four has been funded (25%) and this overall success rate is similar to the national average and above the European average (22%). In addition to the supported projects, some projects were positively rated but not financially supported because of insufficient budgets. In total, 45% of Walloon participations to proposals met EU quality standards. Walloon companies have been particularly active with, in total, 92 involved in on-going projects (against 35 for FP5), representing a quarter of Belgian companies involved and a total of 155 fruitful participations to project proposals. In addition, 13 of these companies are projects coordinators. Two out of four companies that participated at least once in a project application are involved in a funded project.

74. <http://www.ncpwallonie.be>

FIGURE 30 Number of participations to funded projects by Walloon organisations

BOX 21 **FIRST measures**

The FIRST measures form a comprehensive package aimed at strengthening university-industry cooperation and encouraging the transfer and exploitation of research results in the Walloon economy. Originally launched in 1989 as a measure aimed at universities and enterprises, a number of sub-schemes with specific objectives and target groups have since been developed.

Through FIRST, university researchers gain the opportunity to learn about industrial realities while maintaining their academic anchor. Each project provides support for the salary of a young researcher for two years or more in order to conduct within an academic institution a targeted research project that is likely to have an eventual impact on regional economic and social development.

Three key objectives are pursued:

- an increase of the scientific and technological potential of academic research units and accredited research centres;
- the economic exploitation and the transfer of this potential towards Walloon companies;
- the training of researchers as future business executives with a competence in emerging technologies, enabling diffusion in Walloon companies where it is hoped they will continue their professional activities.

Three versions of the FIRST programmes target academic researchers:

- The FIRST Post Doc mandates are awarded to university researchers, in order to conduct a post-doctoral research oriented towards the interests of an industrial partner or an accredited

research centre that cofinances the project.

- The FIRST Higher Education Institutions (FIRST Hautes Ecoles) are awarded to researchers from research centres associated with Hautes Ecoles. They conduct research of interest to an industrial partner sponsoring the project.
- The FIRST Spin-Off programme allows academic researchers to explore possibilities of starting a business based on the results of their research. Since the launch of the FIRST spin-off scheme in 1999, 49 spin-offs have been created as a result of the scheme, out of which 46 were still active in 2008.

Accredited research centres are eligible to apply for FIRST DO.CA mandates in order to conduct research that should enable the

centres to develop or strengthen scientific expertise useful for companies in the Walloon Region. The project should support a doctoral thesis of a young researcher at an accredited research centre in collaboration	with a French-speaking academic research unit located in Wallonia. The FIRST Enterprise scheme strengthens the scientific and technological potential of a company through funding the	hiring and training of young researcher to do an internship within a university, or university college, research unit, or within a PRO.
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FIGURE 31 FIRST schemes – number of mandates granted per year and budget (in thousand €)

FIRST MANDATE	2001	2002	2003	2004	2005	2006	2007	2008
POST DOC						19 2,770	21 3,421	14 2,248
SPINOFF	11 1,313	7 1,124	14 1,894	14 1,902	15 2,198	17 3,338	13 2,908	18 ⁷⁵ 3,843
HIGHER EDUCATION INSTITUTION	8 811	9 1,054	10 1,134	10 1,107	8 994	10 1,447	9 1,254	11 1,651
DOCA						4 486	4 531	
ENTERPRISE	28 2,420	17 1,419	26 2,210	19 1,684	17 1,574	29 2,438	15 1,446	30 2,879

Source: WPS DG06

BOX 22 Mobilising programmes

The mobilising programmes⁷⁶ are one of the main instruments supporting industrial research in Wallonia for HEI research units, PROs and accredited collective research centres. They aim at fostering research in areas strategic for the development of the region, via the concentration of R&D efforts in future technologies. The mobilising programmes pursue two objectives: to strengthen the scientific potential of HEIs and to exploit the results within the Walloon economy. This double objective is achieved by funding applied research projects, that may result in commercially viable technologies for existing or newly-created businesses.

These programmes have, over the last 10 years, notably covered ICT applications, human medicine, engineering and new materials, digital sound and imaging technologies, biotechnology and nanotechnology. A specificity of the programmes is that project evaluations from two independent foreign experts are requested during the selection process. Moreover, they focus on interdisciplinary collaboration between research teams and, even impose, the involvement in the projects of several research institutions. The evaluation of the proposals is based on multiple criteria such as the scientific quality of the project, its relevance to the techno-economic needs of

the Walloon economy and the contribution of the research to technological progress.

The programme funding is allocated via calls for proposals. Funding of selected projects is provided through grants covering 100% of eligible costs for universities and other HEIs and 75% for accredited research centres that can be project partners. The budget varies annually according to the number and type of programme running. On average a programme has a budget of €20m and runs for 2-3 years. Under the Marshall Plan for Wallonia, €25m is earmarked each year for mobilising programmes.

75. One of these projects was financed through the 'energy' budget for a total of €172,785

76. <http://recherche-technologie.wallonie.be/fr/menu/ressources/programmes/les-programmes-mobilisateurs.html>.

BOX 23 Programmes of excellence

Programmes of excellence exist since 2005 and aim to concentrate financial resources on the activities of university laboratories renowned for their excellence and their capacity to exploit research results. Projects receive a fixed funding for five years allowing them to mobilise substantial resources on a specific theme. The funds should cover the different phases of the innovation process from basic research to industrial application of results.

The objective is to create a leverage effect that supports the creation of a research institute with the necessary reputation and critical mass to take part in large European projects. Themes have been decided by the Walloon Government based on a mapping of the excellence areas of the Walloon Region made by the FNRS and cross-checked with regional industrial policies. For each thematic programme, annual funding of €5m over five years is co-financed by the Walloon Region and the universities. The programmes of excellence should

focus primarily on projects for which industrial development can be ensured during or by the end of the programme. The lead university works with 'satellite' teams providing advanced specific skills needed for the programme. The programmes of excellence are implemented in three phases (two-two-one years), and are subject to a 'peer review' at the end of each phase.

As of end 2008, the following programmes of excellence were supported, of which three were in the framework of the Marshall Plan:

- 2005: NANOTIC (nanotechnologies and ICT) awarded to the Catholic University of Louvain (UCL).
- 2006: NANOTOXICO (toxicity test for three types of nanoparticles) awarded to the Facultés Notre Dame de la Paix (FUNDP, in Namur).
- 2006: NEOANGIO dedicated to angiogenesis for cancer treatment awarded to the University of Liege (ULG) in

partnership with the Free University of Brussels (ULB) and the UCL.

- 2007: NUMEDIART (numeric multimedia arts) awarded to the Faculty of Engineering of Mons (FUCAM) and the UCL.
- 2007: CIBLES on diagnostic and therapeutic targets identified by functional genomics awarded to the ULB in partnership with the ULG and the UCL.
- 2008: DIANE (Inflammatory Disorders in Neurological Affections) led by the UCL in partnership with the ULB, ULG and FUNDP.

The programmes of excellence must meet objective criteria that are intended not only to ensure the scientific underpinning of the project, but also to provide both scientific and economic benefits, particularly through partnerships with the private sector, the registration of patents and the creation of spin-offs.

FIGURE 32 Programmes of excellence in Wallonia (€ thousand)

	2005	2006	2007	2008	TOTAL
CIBLES (MARSHALL PLAN)			7.496		7.496
DIANE (MARSHALL PLAN)				5.000	5.000
NEOANGIO (MARSHALL PLAN)		2.500	7.500		10.000
NANOTIC	2.223	2.607	2.610	2.531	9.971
NANOTOXICO	1.048	952	1.243	919	4.162
NUMEDIART			978	1.023	2.000
TECHNOSE			1.000	1.000	2.000
TOTAL	3.271	6.059	20.827	10.472	40.629

Source: WPS DG06

BOX 24 Support to R&D for SMEs

Some measures, specifically addressed to SMEs, help remove financial and technical uncertainties related to an industrial project. They cover all aspects of the feasibility of a project, including IPR.

- The scheme Research Project Manager (Responsable de Projet de Recherche – RPR) funds the salary of a person recruited to lead an industrial research project within a company, including new product design, the study of a new manufacturing process or a technological analysis. The person should not be part of the company personnel at the time the aid is granted. The assistance takes the form of a grant covering part of the salary of the person for a

period ranging from six months to two years, including employers' social charges, fees for overseas missions, the participation to seminars and the costs for specialised documentation. The company first undergoes a technological audit the cost of which is borne entirely by the region.

- Grant support is also awarded to SMEs to use external expertise within the framework of innovative projects. Such support may be granted for a technical feasibility study for a development project of new products or services (technical support), the feasibility of new software of industrial relevance (innovative software), the feasibility of a technology transfer or the evaluation of the

likelihood of commercial success of a new product or service.

- A third measure provides financial support to SMEs for filing or extending patents to protect their R&D results. The rate of subsidy varies between 35 and 70% depending on the nature of the project and of the firm; and covers two cases:
 - For a first patent filing in a national or international patent office accompanied with a search request and the analysis of the search report.
 - For the extension of the territorial protection with a request of priority rights and the award in the designated countries.

FIGURE 33 SMEs R&D and innovation measures in Wallonia (€ thousand)

TYPE OF SUPPORT	2005		2006		2007		2008	
	#	BUDGET	#	BUDGET	#	BUDGET	#	BUDGET
Responsible for research projects (prev. RIT)	23	2.303	10	1.107	11	1.125	20	2.456
Technical support	23	1.054	26	1.818	30	2.313	38	2.637
Feasibility study for innovative software	11	584	17	1.082	12	784	18	1.222
Sectoral study		0		0		0	1	38
Technical-marketing study	1	10	4	227	2	40	4	106
Patent registration		0	16	64	18	98	21	113
Patent extension		0	8	274	13	798	20	1.121
TOTAL	59	4.028	81	4.572	86	5.157	122	7.692

Source: WPS DG06

4.2.2.2

Directorate General for Non Compulsory Education and Scientific Research – DGENORS

Of the five DGs that make up the Ministry of the French Community, the DG of Education and Scientific Research⁷⁷ and, more specifically, the DGENORS (Direction générale de l'Enseignement non obligatoire et de la Recherche scientifique,) is by far the most concerned by STI issues. Other departments of the Ministry are responsible for sectoral research programmes related to matters within their fields of competence: notably health, culture and sports.

Within DGENORS, the General Service of Regulation and Scientific Research has the mission to finance universities, the FRS-FNRS and its associated funds as well as participating in a series of federal programmes. It is also responsible for implementing European initiatives in the areas of research (partnership for researchers, management of intellectual property rights, joint programming, etc.) and education (Bologna process) for French-speaking Belgium. It monitors the participation of public research organisations in FP7. Finally, it works in conjunction with other authorities to determine the Belgian position in the research field in the EU Competitiveness Council.

The research budget of the French Community is divided into five lines, as displayed in **FIGURE 33**.

FIGURE 34 Budgets allocated to R&D policy in the French Community, 2008

ACTION LINES	BUDGET 2008 (€M)	SHARE OF TOTAL BUDGET
FRS-FNRS and associated funds	89.439	32.79 %
Basic funding of universities ⁷⁸	147.461	54.06 %
Concerted Research Actions (ARC)	13.942	5.11 %
Special Research Funds (FSR)	13.756	5.04 %
Various subsidies	8.170	3.00 %
ALL ACTION LINES	272.768	100 %

Source: WPS DG06

The mission of the French Community is to fund non-oriented research and, hence, the policy does not have a thematic focus, with some exceptions (which represent a very small share of the budget of the supported actions) related to the exercise of own competences, in particular, education. Almost all calls and grants are therefore managed according to a bottom-up principle, that is to say, at the initiative of the researchers themselves.

77. www.enseignement.be

78. The amounts indicated are the share of R&D estimated to be 25% of the overall subsidy.

The freedom of choice that is left to the researcher is limited by an understandable requirement for quality. Therefore funding for research projects is primarily based on the criterion of excellence. The latter, however, does not come into play initially since the French Community provides institutional funding through its agencies (FRS-FNRS and associated funds) to the universities based on a pre-defined share of funds. Hence, the competitiveness principle comes into play only at the level of agencies, academies or universities.

4.2.3

Other implementing bodies

4.2.3.1

Scientific Research Fund – FRS-FNRS

The FRS-FNRS⁷⁹ (Fonds de la Recherche Scientifique) was established in 1928 as a non-profit organisation to promote scientific research in Belgium. The organisation was initially privately funded but after 1945 became partly subsidised by Government. During the 50's and 60's several complementary (sub-) funds were created. In 1994, a fund for research within industry and agriculture (FRIA) was created. Following the federalisation of Belgium the FNRS became the agency funding scientific research in the French Community.

The mission of the FNRS is to develop non-oriented scientific research on the basis of initiatives presented by researchers. The organisation promotes the production and development of knowledge through support to individual researchers as well as through research programmes carried out within laboratories and units of the universities of the French Community. The action of the FNRS is therefore mainly focussed on researcher training and research development. Financial support from the FNRS is based on the sole criteria of scientific excellence.

With a budget of €89.5m in 2008, the FNRS, and its associated funds, is one of two main research funding sources in the French Community, accounting for almost 33% of the R&D budget. Moreover, the funds also receive contributions from the Federal Authority (mainly through fiscal measures), the Walloon Region (contribution to FRIA grants) and the private sector and charitable sources (Télévie Operation, donations and bequests from individuals, donations from companies).

In 2008, the FNRS supported more than 1,300 PhD researchers and 900 post-doctoral researchers. The organisation provides funding for temporary or permanent individual researchers, financing for research teams, grants for favouring scientific exchanges and awards scientific prizes.

79. www.frs-fnrs.be

FNRS and its associated funds cover all scientific disciplines. The organisation works through a small administration and a larger pool of experts from the universities in Belgium and abroad. The FNRS uses a 'bottom-up' approach in its funding and therefore researchers and laboratories propose 'own-initiative' research projects to the FRS-FNRS. FNRS funds are permanently open for applications but there are indicative deadlines, generally, corresponding to the academic year. The scientific committees, including domain experts, evaluate the proposals and suggest a ranked list of applicants to the board which takes a final decision on whether to fund the project.

BOX 25 FNRS development plan (2004-2009)

Initially drafted in 1996, it was not until 2005, however, that budgetary means were made available to the FRS-FNRS to enable the implementation of the development plan, in the context of the ERA and the Barcelona objective. During 2004-2009, following a commitment to the FNRS development plan in the joint governmental declaration of the French Community and the Walloon Region, the Community budgetary appropriation was significantly increased (from €66.5m in 2004 to €89.2m in 2008, or an increase of 34% including salary indexation and adjustments to pay-scales). The FRS-FNRS was also given additional funds through the Walloon Marshall Plan; as well as from two federal initiatives: the tax exemption for post-doctoral students and a measure in favour of employment in basic research. During 2009, the development plan objectives were achieved, namely:

- In terms of human resources
 - PhD students: Increase the number of new candidates from 80 to 100 per year; on 1 October 2008, there were in total 493 FNRS doctoral candidates;

Increase the number of FRIA grants from 400 to 600; in 2004, there were 480 grants awarded, with Marshall Plan funding the target of 600 was exceeded in 2009.

- Promote an increase in the number of medical doctors undertaking research; as a result a grant for doctoral clinical researchers was introduced in 2008.
- Post-doctoral researchers: Increase from 35 to 60 per year the number of new research assistants and increase the length of their funding from three to four years; between 2006 and 2008 the number of research assistants increased from 240 to 354. Increase the number of permanent researchers from 370 to 400, a target achieved in 2007-2008.
- In terms of mobility: facilitate post-doctoral research for a minimum of two years in foreign laboratories for Belgians and reciprocal research by foreign post-doctoral researchers in Belgium.

- Increase the likelihood that Belgian researchers living abroad, particularly in the USA, return to work in Belgian labs. This objective was, partially, achieved, by the launch, in 2008, by the FRS-FNRS of the 'Ulysse Mobility grants'.

- In terms of improving the working conditions of researchers
 - Awards grants for operating costs for all researchers of the FRS-FNRS, and associated funds; since 2005, over 2000 lump-sum grants have been awarded to newly supported researchers. The Ulysse mobility grants and the Scientific booster grants, created in 2004, also address this objective by providing significant funds for equipment and operating costs.
- In terms of programme and project financing: increase the financial means of the associated funds, by at least 5% per year during four years, net of indexation. This target was not totally achieved but the means available have grown substantially.

The FRS-FNRS supports individual researchers through a number of measures:

- The main measure consists in grants financing the salary of aspiring researchers and enabling them to move through the five stages of a research career:
 - Doctoral student ('Aspirant') – four years funding to draft a doctoral thesis;
 - Post-doctoral researcher ('Chargé de recherches') - four additional years including additional training in a laboratory or a foreign research institution;
 - For those choosing a scientific career, three additional successive stages, beginning with qualified researcher ('Chercheur qualifié'), senior researcher (Maître de recherches) and finally research director ('Directeur de recherches'). A number of the researchers funded subsequently gain positions within the scientific establishment or are granted academic tenure.
- A number of additional more specific posts are funded by the FRS-FNRS: a half-time post, for a maximum of four years, as a clinical-doctoral researcher ('Clinicien-chercheur doctorant') and another half-time grant for specialist clinical-researchers ('Clinicien-chercheur spécialiste' for a maximum of 10 years);
- A research grant ('Crédit aux chercheurs') of a maximum of €40,000 is awarded to a researcher to finance research on a specific project. The grant cannot be used to hire staff, except in the case of a foreign post-doctoral researcher in order to favour international mobility for a temporary period ('Chercheur temporaire postdoctoral');
- The Scientific booster grant ('Mandat d'impulsion scientifique') provides a maximum funding of €150,000 per year over three years and is aimed at young researchers with a novel project and who have the ambition to create an autonomous scientific unit within their institution.
- Funding for a scientific mission ('Mission scientifique') in the form of a sabbatical year awarded to a university professor to enable him/her to carry out research in Belgium or abroad. Such funding may be awarded to a professor of a foreign university but in this case the research must be carried out in the French Community of Belgium.
- A more recent measure, launched in 2008 with the first awards in 2009, is the Ulysse Mobility Grant ('Mandat Mobilité Ulysse'). A grant of up to €200,000 per year over three years may be awarded to a highly qualified researcher, of any nationality, resident for at least five years abroad, who moves to pursue his/her career in the French Community.
- The FRS-FNRS provides funding for the organisation of seminars, conferences and other types of scientific meetings in Belgium. Equally, grants are awarded for short study trips abroad (summer schools, etc) and for active participation to conferences outside of Belgium. Moreover, the fund intervenes to part-finance the publication of journals or scientific books.
- Thanks to donations or via wills, the FNRS can award scientific prizes in the social sciences, biomedical sciences and technological sciences.

- Finally, a support is provided to encourage the creation of networks of researchers or so-called 'contact groups'.

In addition to funding individual researchers, the FRS-FNRS also fulfils a number of other missions, notably:

- As the award of a PhD requires doctoral training, since 2004, the Parliament has attributed to the FRS-FNRS the mission to organise 'doctoral colleges'. Currently, there are 21 such colleges covering specific scientific fields or a complete course of study. Each of the colleges has a number of doctoral (thematic) schools, which are established by a decision of the Doctoral School Commission of the FRS-FNRS. Doctoral schools are created for five years and are evaluated at the end of this period, the first evaluations are scheduled to take place in May 2010.
- Since 2005, in the context of the internationalisation of research, the FRS-FNRS is the NCP for the EU's research FP; complementing the action of the NCP-Wallonia managed by the UWE for regional actors (enterprises, research centres, etc.). To this end, it aims to encourage the development of projects of European dimension and to increase the success rate of applications from universities of the French Community.

BOX 26 Popularising science and developing a scientific culture in French-speaking Belgium

Over the last decade, the regional and community ministers responsible for education and scientific research have spent annually from several hundred thousand euro up to 2-3 million euro in developing actions and research projects in the areas of science education, educational research and the dissemination and popularisation of scientific knowledge.

In particular, through the annual event 'Spring of Science' (Printemps des Sciences)⁸⁰, the French Community seeks to promote the attractiveness of scientific studies, notably to young people, and to pool efforts in this area. The first 'Spring of Science' was organised in 2001 and resulted from the work of an

informal group composed of representatives of academic and applied sciences. This action aims to give a positive image of science, to provide information on scientific job opportunities, to study the initial and subsequent training of teachers and to disseminate scientific culture.

Other budget appropriations support scientific associations, scientific prizes, travel grants for PhD students or postdocs, and finance the staff and the activities of the Royal Academy of Sciences, Letters and Fine Arts of Belgium⁸¹, etc.

In Wallonia, a service of the DGO6 is responsible for managing and

coordinating a series of initiatives in favour of the diffusion of science and technologies. In addition to the support granted by the region to projects introduced by external promoters (exhibitions, conferences, scientific animations, etc.), the DGO6 runs its own awareness-raising actions:

- a website⁸² presenting in an interactive way the actors involved in science promotion and the activities they undertake in Wallonia and in Brussels;
- the monthly magazine 'Athena' aims at spreading intelligible, quality and diversified scientific and technological information;
- the competition 'L'odyssée de l'objet' (The odyssey of the

80. <http://www.printempsdessciences.be>

81. <http://www.academieroyale.be>

82. <http://difst.wallonie.be>

<p>object) which aims at improving the visibility of scientific careers and at developing an entrepreneurial spirit amongst young people;</p> <p>→ thematic events aiming at strengthening the links between awareness-raising actors, students, researchers,</p>	<p>enterprises and the wider public in general. They also aim at demonstrating on an entertaining way the importance and omnipresence of science and technology in daily activities.</p> <p>Key actions funded include: permanent science promotion</p>	<p>centres (PASS⁸³, Museum of Science and Technology at Parentville, Science Adventure Parks); temporary exhibitions or events to promote science and technology; and media based promotion (TV programmes, monthly science, research and innovation magazine).</p>
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BOX 27 A partnership for researchers: action Plan of the French Community 2010-2014

<p>The French Community action plan in support of the European Partnership for researchers contains, firstly, actions undertaken by the FRS-FNRS and by the universities in order to respect the principles of the European Charter for Researchers and a Code of Conduct for the Recruitment of Researchers; secondly, a number of support actions as well as evaluation, analysis and administrative simplification. The implementation of a human resource (HR) strategy within universities should also favour the identification of existing problems in terms of researchers careers or the attractiveness of institutions within the French Community. As a result, a number of legislative proposals may be made to improve the situation of researchers.</p> <p>1. Open recruitment procedures and portability of grants</p> <p>→ ACTION 1 – Reform of the system of appraisal of applications for research grants of the FRS-FNRS in order to make them more open, transparent, competitive and in line with the principles of the</p>	<p>code of recruitment for researchers: suppression of an age limit; informing in writing unsuccessful applicants; selection procedures involving to a greater extent experts from outside of the French Community; improved communication of the calls for candidates and the procedures for obtaining a grant; a new Internet site with improved quality and content of information on the procedures.</p> <p>→ ACTION 2 – Simplification of the procedures for applying for a FRIA grant for holders of a foreign academic qualification. The Government will move to abrogate the dissuasive obligation for candidates with a non-Belgian second cycle degree to prove the equivalence of their qualification when applying.</p> <p>→ ACTION 3 – Creation of a working group 'EURAXESS Jobs' with the mission to propose a policy for the publication of open job posts where they are publicly funded; publish on EURAXESS calls for</p>	<p>applications for the award of FRIA or FRS-FNRS grants; encourage universities to publish available jobs on their own Internet sites as well as on EURAXESS; establish a list of the types of contract open to university researchers (and upload this information to EURAXESS).</p> <p>→ ACTION 4 – Improvement of the quality of information available on the Belgium EURAXESS services pages⁸⁴: publication of a vade-mecum on the Belgian mobility programmes; updating links and identification of key actors; posting of a guide for mobile researchers; publication of the list of types of contracts; FAQ; etc.</p> <p>2. Improving employment and working conditions</p> <p>→ ACTION 5 – Creation of a working group 'EURAXESS Rights' composed of representatives of the universities, the FRS-FNRS and the French Community administration, with the objectives to: define a</p>
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83. <http://www.pass.be>

84. <http://www.euraxess.be>

communication strategy for the implementation of the Charter and the Code; develop in each university a human resource strategy in three phases:

- a gap analysis of the procedures of each institution with respect to the 40 principles of the charter and code
- setting priorities for the HR strategy for each institution
- informing the Commission of the strategy.

→ **ACTION 6** – Creation of a grant supporting universities in developing a HR strategy.

→ **ACTION 7** – Improving the position of PhD holders in public administrations.

→ **ACTION 8** – Creation of a new grade for research managers and heads of technology platforms

→ **ACTION 9** – Creation of a working group ‘Women and science’ composed of representatives of the universities, the FRS-FNRS and

the French Community administration, with the objective to identify difficulties encountered by female researchers, the exchange of good practice and the development of a response to identified problems.

3. Training

- **ACTION 10** – evaluation of the doctoral schools system (first evaluation in May 2010)

4.2.3.2

Associated funds of FRS-FNRS: IISN, FRSM, FRFC, FRIA

The associated funds, which are specialised in certain research areas, and on which the FRS-FNRS exercises control, are the following:

- The ‘Interuniversity Institute of Nuclear Sciences’ (Institut interuniversitaire des sciences nucléaires, IISN)
- The ‘Fund for Medical Scientific Research’ (Fonds de la recherche scientifique médicale, FRSM)
- The ‘Fund for basic collective research at the initiative of researchers’ (Fonds de la recherche fondamentale collective à l’initiative des chercheurs, FRFC)
- The ‘Fund for Research training in Industry and Agriculture’ (Fonds pour la formation à la recherche dans l’industrie et dans l’agriculture, FRIA)

The first three funds (IISN, FRSM, FRFC) award funds to teams to enable them to carry out research programmes. Collaborative projects are also supported thanks to the Televie charity operation and these projects focus on the fight against cancer and leukaemia: 80 teams received funding through this operation in 2008 worth approximately €8.1m. These subsidies cover hiring scientific and technical personnel (PhD students and post-doctoral fellows), acquiring equipment and operating costs of the labs.

The FRIA provides PhD scholarships (four years) to researchers who intend to work in industry or agriculture. The clear economic dimension of the FRIA justifies that it is also funded by the Walloon Region.

4.2.3.3

Agency for Technology Promotion – AST

Operational since 2006, the AST⁸⁵ (Agence de Stimulation Technologique) was created by the Walloon Government following a 2005 evaluation of the network of intermediaries. The evaluation concluded that the transfer and diffusion of knowledge and technologies did not sufficiently meet the needs of regional businesses. Given the need to improve technology diffusion, the mission of the AST is: to lead a successful system of technology transfer in the form of a publicly-funded network, aiming to:

- raise the level of technical innovation among Walloon businesses, giving particular attention to non-innovative firms.
- contribute in this way to the development of a competitive knowledge-based market-place.

The activities and methods used by AST fall into two main categories:

1. improving the functioning of the network
 - Defining the role of each body at the heart of the network.
 - Defining the ‘purpose’ of each body within the network and the profile of its employees.
 - Organising training for these employees, especially through placements at other organisations within the network.
 - An information exchange allowing the effective circulation of members reports on businesses.
 - Creating shared communication tools and media.
 - Evaluating the individual performance of each body and the contribution to the overall performance of the network, using a constantly updated system of indicators.
2. the general promotion and support of technological innovation.
 - organising meetings between the network and groups of businesses from a specific field of activities (biotechnology, micro-engineering, materials, agro-food, information technology, etc.) in order to define exactly how the expressed technological needs can be met by the network.
 - Organising pilot meetings between various individuals from the network and managers from businesses, so they can determine together how to speed up the technological innovation projects undertaken by these businesses.
 - Establishing a classification system for the technological innovation potential of businesses.
 - Managing the technological vouchers measures (‘Chèques Technologiques’) (the only direct financial support managed by AST): a 75% subsidy, granted within three business days and available to all SMEs in Wallonia interested in using the services of a research centre⁸⁶.

85. <http://ast.wallonie.be>

86. www.ct.innovons.be

- To design and moderate a community-based web portal, to be something akin to a 'Facebook of innovation' for Wallonia (see BOX 28).

BOX 28 www.innovons.be – a novel resource for Walloon innovators

Walloon companies seeking to innovate are faced by an ever-increasing scale and complexity of information on funding, employment and access to knowledge. In order to assist firms to deal with this information overload, the web portal www.innovons.be has two main objectives:

First, GUIDANCE! That is, pointing a business towards the information which will enable greater and more successful innovations. How? By

ensuring access to the skills and technologies available (knowledge and equipment) from universities as well as from industry. Second, NETWORKING! A range of providers are available to businesses, to help and assist them with their innovation strategy. Through the web portal www.innovons.be, they can communicate with each other and improve the overall service to business. Much like an express mail parcel, both companies and service providers

can exchange information on www.innovons.be, suggest improvements and monitor the progress of their common innovation projects. All of this with guaranteed security and confidentiality.

The community-based web portal www.innovons.be is also the place to go for companies who wish to apply for *technology vouchers*, a simple, quick and easy way to receive help with innovation projects.

The network managed by the AST is made up of eight organisations, four of which are networks themselves, and all of which existed before the creation of the agency. The network consists of around 300 people in total. The eight bodies are as follows:

1. The LIEU network (www.reseaulieu.be)
 - Members: the technology transfer offices of universities and engineering schools
 - Aims: to develop the knowledge and technologies emerging from research labs (partnerships, new spin-off companies, patent licensing)
 - Challenges: to improve developmental efficiency and to be more aware of the needs of businesses
2. Accord Wallonie network (www.accord-wallonie.be)
 - Members: the technical advisers in the 22 accredited research centres
 - Aims: to enable businesses to gain the maximum benefit from the skills, expertise and facilities of these centres (700 researchers and advisers in total)
 - Challenges: to develop multidisciplinary platforms between the centres and to reach a greater audience amongst businesses
3. SPoW network – Science Parks of Wallonia (www.spow.be)
 - Members: the six Walloon science parks (482 companies and 11,500 jobs)
 - Aims: to facilitate the creation and development of high-tech businesses and to support communication between companies, universities and research centres
 - Challenges: to improve and promote the added value of being based in a science park

4. Enterprise Europe Network Wallonie (www.wallonieeurope.be)
 - Members: 10 local development agencies
 - Aims: to make the 7,500 ‘commercial and technical opportunities’ from the EEN database available to Walloon businesses
 - Challenges: to increase the frequency of technology and partnership exchanges initiated through the database
5. InnovaTech (www.innovatech.be)
 - Aims: to help businesses to structure their technological innovation projects and to assist them throughout their lifespan; to develop methodological tools
 - Challenges: to significantly increase the numbers of businesses that are technologically innovative and are ready to make use of it as a tool for growth and development
6. Pi² Wallonie – Propriété intellectuelle et Innovation en Wallonie (Intellectual property and Innovation in Wallonia) (www.picarre.be)
 - Aims: to increase the awareness of businesses on issues related to intellectual property and to give assistance in this field (confirming freedom to operate, ‘patent alerts’, etc.)
 - Challenges: to increase understanding of intellectual property and to develop tools, so as to make sure that intellectual property is an important part of every company’s innovation strategy
7. NCP Wallonie (www.ncpwallonie.be)
 - Aims: to encourage businesses to participate in the EU’s R&D programmes (FP7) and to assist them in building up partnerships
 - Challenges: to increase participation in EU projects and the number of successful partnerships
8. Cequal (www.cequal.be)
 - Aims: to help businesses adopt a ‘quality strategy’ for all of their activities
 - Challenges: to increase awareness of the importance of a ‘quality strategy’ during innovation projects

4.2.3.4

Economic Stimulation Agency (ASE)

The ASE⁸⁷ (Agence de Stimulation Economique) was set up by the Walloon Government in 2007 in the framework of the Marshall Plan as the regional umbrella organisation for business development services (provided by business and innovation centres, chambers of commerce and local development agencies). The economic promotion consists in providing project holders and entrepreneurs with a set of tools and services in order to raise their awareness on the creation of economic activities in Wallonia and to support them throughout the stage of a firm’s development.

87. <http://www.as-e.be>

The main activities of ASE consist of:

- Promotion of entrepreneurship via a strategic plan combining initiatives addressed to young people, teachers and other cross-cutting actions.
- Overall co-ordination of public support for the creation and development of enterprises via a network of six local co-ordinators managing the activities of 22 public operators.
- Direct support: pre-activity grants helping people to transform an innovative idea into a business project and innovation grants helping SME's to implement innovations in non technological fields (marketing and/or organisation).
- Pilot actions in the field of strategic intelligence to promote the use of such tools by businesses and create a resources centre.
- Support business buy-outs by promotion and assistance actions.

4.2.3.5

Walloon Telecommunication Agency – AWT

Created in 1999 by a decision of the Walloon Parliament, on the initiative of the Government, the AWT⁸⁸ (Agence Wallonne des Télécommunications) aims to promote ICT in Wallonia, in terms of production, diffusion and use. On the basis of a management contract with the Walloon Government, the AWT's mission is to promote universal access to ICT and to encourage its widespread use. This mission has three fundamental pillars, namely:

- Watch: The mission of the Agency is based primarily on its ability to perform a high level technological, legal, societal and economic watch on ICT.
- Advice: based on its watch activities, the agency acts as an advisory body for the government, the Walloon public services, and other regional organisations and public interest companies.
- Promotion: the agency aims to ensure a maximum visibility of its activities and to diffuse the results of its watch activities to its main target groups.

In particular, the government has entrusted the AWT with the mission to develop services for enterprises, especially SMEs, in order to stimulate the professional use of ICT. This mission, for which the AWT receives an annual operating grant from the regional research budget, consists notably in carrying out surveys and studies on the use of ICT, establishing databases, organising technology watch activities, developing and maintaining a portal and implementing promotional campaigns.

Its current action is centred on:

- E-business: to promote ICT use in SMEs in complement of aids granted by DGO6, AWT published an e-business guide and developed a permanent directory of the ICT sector enterprises in Wallonia. It organises a professional network to stimulate the exchange of experience between SME'S.

88. <http://www.awt.be>

→ E-learning: AWT has been charged by the Government to create an e-learning platform to federate Walloon actors and initiatives in this field. A portal 'Learn-on-line' and an e-learning guide have been developed to carry out this action.

4.2.3.6

Sowalfin (Walloon SME Financing Agency)

Sowalfin was created in 2002, in order ensure co-ordination of all the public financing instruments dedicated to SME 's. It plays at present the role of a one-stop shop in this field offering subordinated loans and guarantees for commercial bank loans to firms.

Specific instruments are dedicated to the financing of innovative projects particularly spin-offs and spin-out projects. A new subsidiary named Novalia was created in 2009 to manage calls for innovative projects financed by subordinated loans.

4.2.4

Innovation intermediaries

4.2.4.1

University interfaces

Since 1998, the Walloon Government has funded additional specialised staff responsible for transfer and commercialisation of research results in order to reinforce the university-industry interfaces. The main goal of the measure is to encourage universities and third-level HEIs to strengthen their role in R&D through the commercialisation of their scientific and technological knowledge. The measure is managed by the DGO6 in terms of the handling of applications for funding of interface personnel, a successful application lead to a contract between the region and the HEIs defining missions, duties and reporting obligations.

Since 1998, the region has financed 12 persons in charge of the commercialisation of research results within universities. This represented a total budget of €1,060,000 between 2000-2003, renewed in 2004 for a 3-year period. In 2007, a budget of €1,735,000 was made available to extend the funding until end June 2010.

The DGO6 provides financial support to two persons in charge of commercialisation in each of the three full universities, to one person in each of the other universities carrying out industrial research, and to one person for the group of non-university HEI. These persons usually work within the research management (handling contract research with enterprises, etc.) department of their institution. They are in charge of identifying the potential to commercially exploit research results as well as to manage the intellectual property strategy.

In the framework of the Marshall Plan and following an evaluation of the science and technology intermediation system in Wallonia carried out in 2004, interface support is, since 2006, coordinated by the AST (see above).

4.2.4.2

Pi2

PiCARRE Wallonia⁸⁹ is an information and expertise centre on intellectual property (IP, such as patents, trade marks, designs and copyrights). Supported by the Walloon Region and European funds, PiCARRE Wallonia works for all innovation players and creators of economic activity (individuals, companies and research centres) through the provision of advice on IP.

Recognised by the EPO and the Belgian Office for Intellectual Property (OPRI-DIE), PiCARRE Wallonia is also a PATLIB centre (PATent LIBrary – information centre on patents, trademarks and industrial designs), belonging to a European network of over 300 relays.

4.2.4.3

LIEU

Created in 2003, the LIEU network⁹⁰ brings together university and other HEI interfaces and research commercialisation bodies of the French Community. The main activities of these units are technology information, technology assessment and transfer, the creation of spin-offs and the fostering of exchange between laboratories and companies.

The objectives of the LIEU network are to:

- Strengthen and promote the activities of universities in partnership with the socio-economic actors, especially with a view to promoting regional development;
- Promote the professionalisation of interface and commercialisation activities, notably through the provision of training, the dissemination of good practice and the development of common tools;
- Promote collaboration between the interface structures of the different universities;
- Participate in European and international networks related to university-industry relations and technology transfer

The LIEU network is an operational working group of the CReF rather than a separate legal entity. The network management bodies are on one hand a steering committee and, on the other, a management committee, accompanied by a coordination unit.

89. <http://www.picarre.be>

90. <http://www.reseaulieu.be>

4.2.4.4

Innovatech

InnovaTech is a not-for-profit association (ASBL) with the mission to increase the level of innovation in Walloon enterprises and thereby improve their competitiveness via:

- inform and raise awareness on innovation
- support innovation processes,
- create connections between actors in the innovation system.

From 2001-8, Innovatech operated⁹¹ in the Hainaut Province thanks to financial support from the Walloon Region and the ERDF (Phasing out of Objective 1 programme). Based on the results achieved in the Hainaut, the funding (co-funded by the Walloon Region and the ESF) was extended for the period 2008-2013 and the activities of Innovatech now cover the entire region.

In the first seven years of activity, the technological advisers of InnovaTech contacted 985, or approximately 50%, of manufacturing firms in the Hainaut; 80% of which were SMEs. Slightly more than two-thirds of firms contacted (684) accepted a visit by an innovation advisor; leading to the identification of support needs in 415 enterprises.

The identified needs led to 654 R&D projects, some still on-going, corresponding to a total public and private investment of €19.3m. Moreover, the projects led to the creation of at least 39 jobs.

InnovaTech provides assistance SMEs to manage their innovation and technology projects. The aim is to transfer to SMEs the right methods to enable them to develop the competencies required to manage such projects thanks to a personalised coaching, covering aspects such as: planning, search for partners (technological, scientific and industrial), risk assessment, information on the state of the art and advice on IP, etc.

4.2.5

Main research and innovation performers

4.2.5.1

Universities

Since the FRS-FNRS does not have its own infrastructures (contrary to, for instance, the CNRS in France) and the French Community does not have any scientific or research centre (with the exception of the Museum of Mariemont), basic research is almost exclusively performed in universities. Other non-university HEI

91. At the time, the organisation was known as CeRDT (Centre de Promotion de la Recherche et Développement et de Valorisation des Technologies en Hainaut)

(mainly the ‘Hautes Ecoles’) tend to focus on applied research. Hence, at least 98% of budgetary credit allocated directly or indirectly to research by the French Community goes to laboratories and researchers in universities.

As presented in **BOX 29**, funding of university research in the French Community and by the French Community is provided essentially through the basic funding of universities. The basic funds are distributed among the academic institutions based on the ‘weighted number of students meeting the conditions for granting subsidies.’

The share of research activities in the basic operating funds of universities is estimated at 25%, a figure based on an agreed norm for academic institutions that base their educational mission on research. It is estimated that in 2008, €147.5m of the operating funds were spent on research by universities, amounting to 54% of the budgetary appropriations for research in the French Community, not taking into account funds from other Belgian authorities (Federal, Regions), EU or private sources.

In 2008, there were nine universities receiving funding from the French Community, however, since 2004, the universities have been grouped into three academies (Louvain, Wallonia-Brussels, Wallonia-Europe). Following recent mergers, only seven universities exist and this number will be further reduced to four over time, which will absorb other HEI (e.g. the higher institutes of architecture) as well.

The list in the box below presents the university landscape in the French Community as it stood in the academic year 2008-9, the last year for which final figures on student population are available⁹² (these are indicated in brackets, as well as the mergers that occurred since then). In total, there were 73,249 university students in 2008-9 in the French Community.

BOX 29 Universities of the French Community

University academy Louvain:

- Université catholique de Louvain (21.990 students) – www.uclouvain.be
- Facultés universitaires Notre-Dame de la Paix à Namur (5.083) – www.fundp.ac.be
- Facultés universitaires catholiques de Mons (1.283) – www.fucam.ac.be
- Facultés universitaires Saint-Louis (2.368) – www.fusl.ac.be

University academy Wallonia-Brussels:

- Université Libre de Bruxelles (21.042) – www.ulb.ac.be
- Université de Mons-Hainaut (3.550)
- Faculté Polytechnique de Mons (886; merged in 2009 with the University of Mons-Hainaut, the merged entity now called the University of Mons – www.umons.ac.be)

University academy Wallonia-Europe:

- Université de Liège (16.050) – www.ulg.ac.be
- Faculté universitaire des Sciences agronomiques de Gembloux (997; merged in 2009 with the University of Liège (ULG), retaining a degree of autonomy under the name of Gembloux Agro-Bio Tech – www.fsagx.ac.be)

92. www.enseignement.be/infosup

BOX 30 The Concerted Research Actions (ARC) & The Special Research Fund (FSR)

With an annual budget of €14m, about 5% of the total research funding of the French Community, the ARC provides universities with a specific instrument to develop or strengthen centres of excellence in areas they consider priorities.

The grants are first distributed between the three university academies based on a specific distribution key for the years 2007 to 2015 (in order to ensure stability). This distribution key is based on the number of students enrolled in the final year of the second cycle and in the third cycle, as well as the number of researchers within the institution.

After consultation within the relevant academy and an evaluation by external experts on the basis of clearly defined criteria, the universities can allocate significant funding to multi-annual research programmes, in which are involved ideally several teams pooling multidisciplinary and complementary skills. The ARC projects are normally spread over five years and may be renewed. Annually, there are about 85 to 90 ongoing projects aimed at developing university or inter-university centres of excellence in basic research. The funds may also be used for 'centres of excellence undertaking in an integrated way basic and applied research with a

view to the economic and social exploitation of research results'.

Under the same distribution conditions as for the ARC, a further €14m, about 5% of total funding of the French Community for research, is allocated via the FSR. The fund completes the share (currently set at 17.5% of the grant) that academic institutions are required to put from their own funds (including the basic allocation). This fund allows universities to meet the financial needs of own initiative research, but cannot be used for other purposes.

4.2.5.2**University colleges**

There are 21 university colleges ('Hautes Ecoles', or non-university HEI) located in the French Community⁹³. Most of those that offer technical education have established a research centre as a non-profit subsidiary. The 12 research centres associated to the university colleges conduct industrial research and are, as such, eligible for most Walloon funding programmes: mobilising programmes, FIRST programmes, competitiveness poles, etc.

A specific programme is dedicated to the university colleges: the FIRST Higher Education Institutes (FIRST Hautes Ecoles) allow researchers of the HEI research centres to conduct research directed towards the interests of an industrial partner sponsoring the project. In 2008, the non-university HEIs benefited from funding amounting to about €3m for their R&D activities.

The regional authorities also support the commercialisation of research results developed by the HEI through Adisif⁹⁴, a structure that provides the interface between the HEI research centres and SMEs, and in which the salary of a person in charge of commercialisation of research results is supported.

93. The number will be reduced to 19 as of 2011 following some new mergers

94. <http://www.adisif.be>

BOX 31 WELBIO: Walloon Institute for Life Sciences Lead

End 2008, the Walloon Government created a new institute for cutting-edge research in life science and biotechnologies called WELBIO (Walloon Institute for Life Sciences Lead). With a budget of €30m over five years, the objective of this institute will be the development and commercialisation of advanced non-oriented research in areas that can have applications in all fields of medical, pharmaceutical and veterinary biotechnology. Results that could generate intellectual

property will be protected through patents or exploited through the creation of spin-offs and/or partnerships with Walloon firms, including companies involved in the two competitiveness poles BLOWIN (Health Cluster of Wallonia) and WAGRALIM (Agro-industries cluster of Wallonia). The institute, which is based on the model of the Flemish VIB, is an institute 'without wall'. Legally speaking it is an autonomous, non-profit association (ASBL) operating under contract with the Walloon Region and

working in partnership with the university academies. The research teams will co-ordinate their work across the various university campuses. The programme is made up of two elements:

- Excellence groups: each group receives a budget between €400-800,000 per year.
- Technological platforms: the institute has the mission to ensure the commercialisation of the research results.

4.2.5.3**Accredited research centres**

The Walloon Region accredits twenty-two research centres for their collective research activities. The region devotes considerable funding to support the operations of these centres (more than €13m in budgetary terms on annual basis).

In 2008, a new approach to structuring and co-ordinating the activities of the accredited research centres was proposed. The proposals included:

- The creation of thematic inter-centre platforms in order to co-ordinate research activities and optimise the management of specialised equipment
- A process of progressive fusion of the activities of certain centres
- The creation of a coordination unit with the aim to increase awareness of the potential of the centres both towards regional enterprises and internationally. The coordination unit would also be responsible for reinforcing inter-centre co-operation.
- The creation of a single 'corporate identity' for the centres as a form of trademark allowing them to be rapidly identifiable, notably at the international level.

FIGURE 35 List of collective research centres accredited by the Walloon Region

OFFICIAL ACRONYM	NAME IN ENGLISH	LOCATION
BBRC	Belgian road research centre	Brussels
BCRC	Belgian ceramic research centre	Mons
BIL-IBS	Belgian welding institute	Brussels
CEBEDEAU	Centre for expertise in the treatment and management of water	Liege
CELABOR	Research and control centre on wood and chemicals	Herve
CENAERO	Centre of excellence in aeronautical research	Gosselies
CENTEXBEL	Belgian textile research centre	Brussels
CER	Rural economy centre	Marloie
CERTECH	Centre of technological resources in chemistry	Seneffe
CETIC	Centre of excellence in Information and communication technologies	Gosselies
CEWAC	Walloon research centre on assembling and material testing	Ougree
CORI	Coatings research institute	Limelette
CRIC-OCCN	Belgian centre for scientific and technical researches for the cement industry	Brussels
CRM	Centre for research in metallurgy	Liege
CSTC	Belgian building research institute	Limelette
CTIB-TCHN	Belgian institute for wood technology	Brussels
CTP	International technology centre for earth and stone	Tournai
IMMUNEHEALTH	IMMUNEHEALTH	Charleroi
INISMA	Interuniversity research institute on silicates, soils and materials	Mons
MATERIA NOVA	Centre of excellence on materials	Mons
MULTITEL	Research centre in telecommunications, signal and image processing	Mons
SIRRIIS	Collective centre of the Belgian technology industry	Liege

To be eligible for funding from the Walloon Region, research centres must meet a number of criteria that guarantee the collective nature of the research undertaken and the respect of good management standards. To be accredited, a centre must:

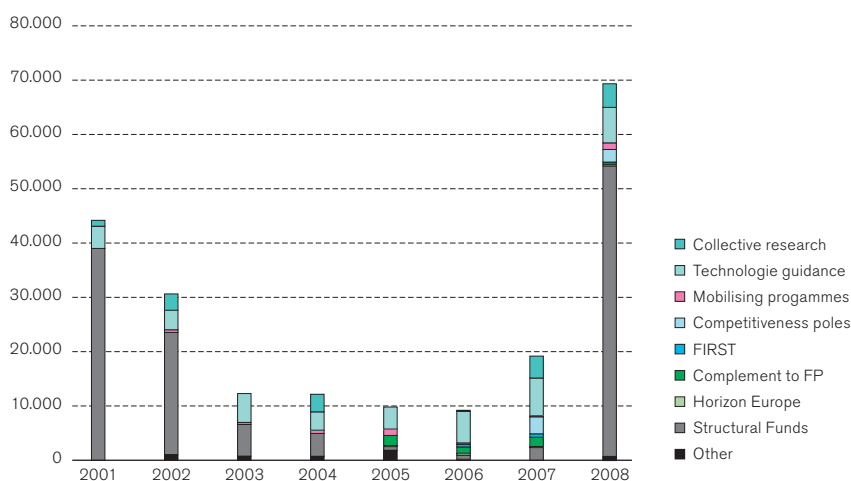
- be a separate legal entity
- have as a mission to undertake industrial research, and specifically:
 - mainly industrial R&D likely to respond to the needs of enterprises at the level of a sector or a field of technology
 - to a significant extent carried out in partnership with universities, university colleges or in the framework of the EU's FP or other international programmes.
 - target firms to which the centre can offer a real added value.
 - With the effect of developing or keeping up to date the know-how and competence base of the centre.

- Keep up to date on a continuous basis with scientific and technical progress, in Belgium as well as abroad, in the centre's fields of specialisation and which offer a high potential for industrial innovation; and use this expertise to regularly contact and consult with firms on required services.
- Have at least half of the centre's board members of the centre from business, with a balanced membership drawn from SMEs and larger firms.
- Keep analytical accounts of their activities and conform with the required Belgian accounting standards enabling the verification of the use of public subsidies from which the centre benefits; and that the price charged to firms is market-based.
- Have at least one operational facility in Wallonia.
- Have a sufficient degree of self-financing capacity in order to be able to co-finance services and research activities; and contribute to the up-keep and reinvestment in equipments and materials necessary for its activities.

Aside from the 'accredited centres', the region also has two public research centres:

- the Walloon Centre for Agricultural Research (Centre wallon de Recherches agronomiques, CRAW)
- Scientific Institute for Public Services (Institut Scientifique de Service Public, ISSEP)

FIGURE 36 Trend in budgetary appropriations for accredited research centres (thousand euro).



Source: WPS DG06

FIGURE 34 highlights that the budgetary credits awarded to the financing of the accredited research centre are strongly dependent on the Structural Funds, even if the regional budget has also increased in recent years.

The Walloon programmes of collective research are aimed exclusively at the accredited research centres, with the aim to assist the centres to develop their expertise and know-how in a technology key for a group of companies or a business sector in Wallonia. A basis requirement for a project to be selected is that it involves at least two centres.

A second regional measure for the accredited centres is the funding of technology guidance services (technology audits for new processes or products as well as advice on required technological know-how) for companies looking scientific or technical expertise. In 2008, 21 technology guidance services received co-financing (80% of costs) in 17 centres, a total budget of just over €6.5m.

The centres tend to work independently, both for R&D projects and for equipment investment, however, synergies are beginning to develop, for example:

- The creation of scientific interest group bringing together the centres (CRM, Matéria Nova and the Cori) active in the field of surface engineering;
- Seven inter-centre technology guidance services have been created since 2006;
- Since 2005, all research projects funded by the Walloon Region must be based on a partnership including at least two research centres.

4.2.5.4

Clusters and Competitiveness poles

Over the last decade, the Walloon authorities have invested in two complementary key actions to improve co-operation in the regional innovation system: business clusters funding the development of networks and of innovative partnerships, be they industrial, commercial or technological; and competitiveness poles supporting implementation of a strategy defined by a broad-based partnership in the form of investments, R&D or training projects in coherence with the competitive positioning strategy defined by all members.

Since 2005, the competitiveness poles are a major plank of the Walloon STI policy with a budget from 2006 to 2010 of €280m. The measure is one of the five priorities of the Marshall Plan and is a major shift in the regional policy both in terms of the financial means mobilised as well as the process of design and implementation. Competitiveness poles are defined as a combination of companies, training centres and public and private research units, working in partnership to achieve synergies on common innovative projects. The partnership is organised around a market and a related technology and aims at building a critical mass to be competitive and have international visibility.

Five sectors and corresponding poles were identified and officially recognised by the regional authorities: life sciences – Biowin; agro-food – Wagralim; mechanical engineering – Mécatech; transport-logistics – Logistics in Wallonia; aeronautics/

space – Skywin. A sixth competitiveness pole focusing on environmental technologies will be launched in the framework of the Marshall Plan2.Green.

Each competitiveness pole has received budgetary funds that should enable it to implement various actions in line with its strategy. The support from the Walloon Region can take different forms:

- Investments in infrastructure, buildings and equipments;
- R&D funding;
- Investment grants;
- Training support;
- Attracting foreign investments and export promotion.

In addition the region partially covers the costs of a management unit for each pole. The participants of the pole retain, in addition, access to all existing forms of support for investment, R&D, employment measures, training and exports according to the normal procedure for proposals presented outside of the pole framework. All funding is granted on the basis of a call for projects (except grants for FDI support and export promotion). Proposals presented within the framework of the cluster such as projects included in the business plan or subsequent work-programmes for spin-offs, qualify for the maximum aid and a specific top-up for some of the measures.

The private sector has a key role in steering the competitiveness poles in partnership with the French-speaking universities, which have the right to appoint a deputy chairperson to the board of each cluster.

The first steps of in project selection are managed by the poles themselves, namely

- Internal calls for projects in each cluster;
- Selection by an internal jury then by the governing board;

The following steps are:

- Eligibility check of projects by the administrations concerned;
- Selection by an international jury composed of experts independent from the government and the administration;
- Decision of the Walloon Government.

Regular calls for projects for the members of the five poles are organised by the Walloon Government. Between 2005 and 2008, the Government approved 55 research projects following four calls for projects.

FIGURE 37 **Competitiveness poles: budgetary allocations of the Walloon Region per type of beneficiary, 2001-2008**

NUMBER OF APPROVED RESEARCH PROJECTS (ON 31/12/2008)	CALL 1 2005	CALL 2 2006	CALL 3 2007	CALL 3BIS 2008	TOTAL
Skywin	5	2	4	1	12
Biowin	1	5	4	0	10
Mécatech	5	2	3	7	17
Logistic	2	1	1	1	5
Wagralim	2	5	2	2	11
TOTAL	15	15	14	11	55

Source: WPS DG06

The Walloon cluster policy, launched in 1999, supports, within a given field of activity, enterprises (and other relevant operators) willing to work together within the framework of collective actions (sectoral seminars, marketing abroad) and industrial or commercial partnership initiatives. After a pilot phase, viewed as promising by the Walloon Government following an external evaluation, a cluster Decree was adopted by the Parliament in January 2007.

The clusters develop their actions according to the following six guidelines:

1. improve knowledge amongst the enterprises of the cluster with a view to knowing the environment of the concerned area of activity.
2. strengthen commercial links between the cluster's enterprises allowing them to improve innovative capacity and competitiveness.
3. develop partnerships between cluster members for the production of goods and services, R&D or marketing or, in some cases, new firm creation.
4. promote the cluster on a local and international level, e.g. through participation in specialised trade fairs; encourage foreign investors to set up in Wallonia.
5. share knowledge and exchange good practices between the clusters, including on an international level.
6. reinforce synergies between activities of the clusters and those of the competitiveness clusters.

The region funds 100% of the costs of a cluster manager during the first three years, 80% the next three years, and 50% thereafter. Eligible costs are set by the Government and are subject to a €160,000 yearly ceiling. The grant can be renewed after the first three years depending on the outcome of an evaluation and based on a new action plan with new goals for the additional period.

The Government may also grant a subsidy to specific clusters which set up a partnership with a view to participating in international cooperation programmes or

which enter into cooperation with other clusters to achieve a specific task, including an internationally. In this case, the ceiling of assistance is of €24,000.

As of 2010, 14 clusters are supported in Wallonia: Automotive, Aeronautic, Solid waste, Eco-building, Space, Nutrition, Clinical research, ICT, Transport/logistics, Photonics, MITECH (Micro-Technologies for Intelligent Manufacturing & Products), TWIST (Text, image, and sound technologies), TWEED (Energy savings/sustainable development technologies), CAP2020 (Energy saving performances of buildings) and Plastiwin (Moulders, plastic parts, and raw material).

Under legislation adopted in Wallonia in 2008 on R&D support, R&D projects of clusters and competitiveness poles enjoy more favourable financial conditions than 'individual' projects, namely: an increased subsidy of 15% for industrial research projects and the possibility to choose between a reimbursable loan or a subsidy (at a lower rate than the loan) for an experimental R&D project.

4.3

Perspectives for STI policy in Wallonia and in the French Community

Over the last few years, notably influenced by European and global trends in research, a number of priorities have been added to the policy agenda of the French Community and Walloon Region in the field of R&D. Since 2004, this has resulted in the definition of a range of measures, some of which have been launched, others reinforced and finally a number remain on the drawing-board requiring further work. The four interlinked priorities, or lines of actions, are:

- Reinforcing the financial means available for scientists and companies to undertake R&D.
- Improving the image, security of employment and working conditions of researchers
- Ensure greater coherence and synergies between the actions of the French Community, the Walloon Region and the Brussels-Capital Region;
- Internationalisation of the French-speaking research community and Walloon firms in order to reinforce their visibility and competitiveness.

In terms of the first priority, the reinforcement of financial means available for scientists to undertake R&D takes various forms including: boosting the number of scientific and technical staff available; increasing operational budgets of university labs; increased funding for industrial research and for product and process innovation, including by enterprises and accredited research centres; and the development of advanced research infrastructure in universities and research centres. To this end, there has been a significant boost to public investment during the last decade, and particularly since 2005. Annual budgetary appropriations for R&D of the French Community increased from €207m in 1999 to €272m in 2008; further increases being limited by the law on funding of federated authorities. The Walloon Region has more budgetary 'room for manoeuvre' and budgetary appropriation increased by 50% over the decade to 2008 to reach €332m. In both cases, the increase in budgetary means has had differentiated results depending on the recipients. As far as the Community budget is concerned, the FRS-FNRS has been the main beneficiary, based on successive development plans and notably the plan of 2000, only implemented from 2004 onwards and concluded in 2009. A new plan has since been approved, in March 2009. Equally, but to a lesser extent, the university academies have seen research funds increase and stabilise. After an increase of one million euro by institution, a decree of 30 March 2007 fixed the basic subsidies distributed via the ARC and the FSR and the distribution ratio for the coming years.

Concerning the Walloon budget, the increase in R&D funding accelerated from 2006 onwards with the implementation of the 1st Marshal Plan. The increase in appropriations for R&D gave a budgetary boost to various types of actors in the innovation system including enterprises, collective research centres and universities. Additional financial resources have been mobilised to co-finance the investments undertaken in the framework of Structural Fund programmes in the region; and have also led to an increase in budgetary appropriations for R&D. However, such increases in budgetary appropriations are a one-off boost spread over six years, with a notable increase in budget in the early years (2008 for the current period) decreasing over time and raising the issue of sustaining investment beyond the life of the current 2007-13 period. For the period 2000-2006, the accredited research centres were the major beneficiaries of Structural Fund investment; while for the 2007-2013 period, the funds allocated to the funding of research projects and investments have been approximately split 60/40 between accredited research centres, on the one hand, and the universities and university colleges on the other.

Concerning the second priority, the image, security of employment and working conditions of researchers, the actions taken are fully in line with the European Charter for Researchers. The action of the Community aims to improve the objectivity and transparency of decision making on recruitment and researchers career paths, including in terms of equal opportunities.

It is estimated that in order to contribute to Belgium reach the 3% GERD/GDP objective, the French Community would need to increase public expenditure by half again. Even if this was achieved, it would require a corresponding increase in the availability of researchers, either freshly graduated or attracted (back) from abroad. The current Government foresees an intensification of the awareness raising campaigns (such as the Spring of Science) aimed at encouraging young people to pursue scientific studies. In addition, there is a need to reduce the precarity of employment for researchers if newly graduated scientists are to be retained in the research community. Within the French-speaking universities, four categories of researchers exist: scientific researcher and academic tenure both funded by the block grant, researcher funded by external contracts from essentially public grants (including EU), and researchers funded by the FRS-FNRS.

Uncertainty over a researcher's career concerns principally the first two steps in a researchers life, namely the preparation of the PhD and the post-doctoral training. The third category of researcher is particularly exposed to the risk of not being able to pursue or complete their training, since they depend on numerous short-term contracts, before finally being given a permanent position (which still does not protect them from being made redundant if there are no funds).

Harmonising the four types of career paths is complex, not only because of the diversity of situations, but also because the competence for various policies supporting researchers careers are spread across the different authorities (e.g. tax and pension are the responsibility of the Federal Government). Nevertheless certain measures have been taken, for instance, the FRS-FNRS has obtained, in line with the previous development plan (see **BOX 25**), the necessary budget for a substantial increase in the number of FRIA grants, and envisages, in its current plan to harmonise the stipend scales with those of the FNRS researchers. The DGENORS has also sought to simplify the administrative procedures related to the recruitment of researchers (FRIA and FNRS), via the Partnership for Researchers action plan drafted in 2010 (see **BOX 27**).

The third priority is to ensure greater coherence, rationalisation and synergies in the actions of the French Community, the Walloon Region and the Brussels-Capital Region authorities. The objective is to create a unified research area covering French-speaking researchers in both Wallonia and Brussels. Specific actions include:

- Encouraging greater inter-disciplinary research as well as inter-institutional and inter-sectoral research
- Taking greater account in planning of research funding of strategic cross-cutting themes, such as sustainable development, ageing, health and renewable energies;
- Reinforcing the action of the AST towards the networking and professionalisation of the network of technology transfer and innovation advisory organisations.

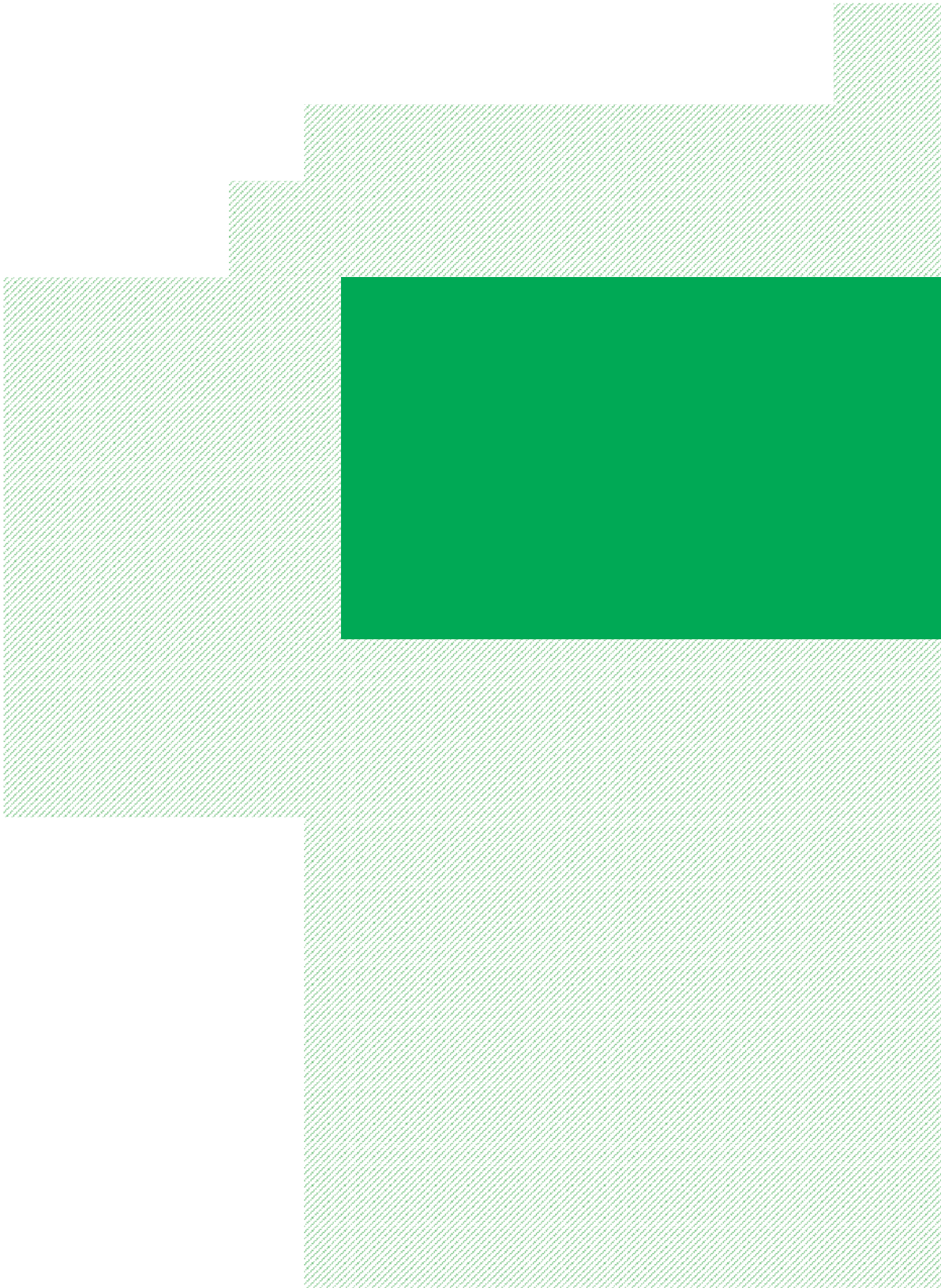
- On-going implementation of research programmes targeted towards economically exploitable results, based on partnership and mobility between research and industry.
- Pursuing the policy of networking of enterprises through the clusters and competitiveness clusters programmes and the creation of structured and long-term co-operation between academic and public researchers and enterprises.
- Promoting public-private partnerships with a view to funding industrial research.
- Finally, there is a need to strengthen the process for technology assessment with a view to supporting decision-making on public policies.

Finally, in terms of internationalisation of R&D, the fourth priority, in the French Community and Wallonia, the actions taken are fully in line with the aim to foster greater integration of French-speaking researchers and Walloon enterprises in the ERA, including:

- Support for international mobility (both authorities, as detailed in previous sections);
- An active participation in ERA-Net programmes: the Walloon Region is involved in eight projects, including one as a co-ordinator. In addition to the numerous opportunities for increased exchange with policy actors and specialists across Europe, these initiatives are important in opening the doors for French-speaking universities, research centres and enterprises to a number of international calls for proposals for which they can receive regional funding.
- Reinforcing cooperation amongst the actors in the system to create critical mass:
 - Inter-university and inter-academic cooperation; including the gradual integration of university colleges and mergers between universities
 - A priority to funding projects based on partnership and inter-disciplinary approaches in terms of the selection criteria for various regional and community programmes.
 - Increase cooperation between accredited research centres with a view to maximising synergies and avoiding overlaps in terms of know-how and expertise.
 - Creation of teams supporting the drafting of projects of a European dimension;
- Encouraging the international promotion of research results.

In Wallonia, increasing attention is given to a broader support to innovation as a form of 'new industrial policy'. The main current priorities can be summarised as follows:

- Continue to stimulate all actors to develop long-term collaboration by the pursuit and amplification of new industrial policy mechanisms to incite and help innovation actors to work together (competitiveness poles, clusters). Partnerships are also stimulated by a re-orientation of funding conditions notably for business R&D projects and the design of new programmes where companies, scientific institutions and public authority are involved in the financing of the project (PPP).
- Focus on promoting innovation in non- and barely innovative firms through the networking and a better co-ordination of business support operators, and the development of synergies between business and technological advisory services.
- A stronger focus on the strategy and structuring of the innovation system notably by the development of management and evaluation tools. This aim is to improve functioning internally and a better integration into European networks by the implementation of a systematic evaluation of R&D programmes and the implementation of a technology assessment process as a tool for decision-making in different fields of public action.
- A better integration of the 'sustainable development' dimension notably by the creation of a centre of excellence and the funding of R&D programmes in this specific field and taking the sustainability criteria into account in the selection process of projects financed in other programmes.





5. STI POLICY IN BRUSSELS-CAPITAL REGION

5.1

General orientations of STI policy in Brussels-Capital Region

Created in 1989, Brussels-Capital is a relatively young region, and during the first decade, the region 'sub-contracted' most of the policy related to research to the Federal authorities. However, over the course of the last decade, it has developed a comprehensive system of encouragement, support and follow-up of research and innovation in Brussels. Indeed, since 2004, the Brussels authorities have increased their support to research and innovation recognising the potential contribution to economic development of the city-region.

To understand the specific orientations of the regional STI policy, it is necessary to take account of some specific features of the 'capital of Europe'. Brussels hosts in a very small territory many universities and colleges of higher education and a number of top-level university hospitals. The region is truly multilingual and hosts many important international, national and regional representative bodies, policy think-tanks and, of course, the EU institution.

With 13.000 employees (of which, about, 9.000 researchers), the research sector has an important weight in the economy. Moreover, the highly developed, service-driven, economic structure of the Brussels-Capital Region makes a strategy founded on innovation and research, as proposed by the 'Lisbon Strategy', relevant even if Brussels's urban characteristics impose certain trade-offs.

In its June 2009 memorandum to the new regional Government, the Science Policy Council of the Brussels-Capital Region identified a few facts and opportunities for research in Brussels on which the STI strategy was to be built.

- Brussels has a unique potential with a significantly large concentration of companies active in research, totalling more than 10% of private employment in Brussels, and a very significant presence of students in higher education.
- Brussels is characterised by a service economy that forms an ideal growth base for capitalising on the knowledge economy.
- The regional science policy is increasingly structured but suffers from the constraints of resources and the territory of a city-region.
- The specificities of Brussels as regards multiple players, their proximity, international exposure, the role of capital and the open regional economy, place it in an ideal position to take advantage of the process of open innovation.

- The Belgian EU Presidency in 2010 represents an opportunity to improve the effectiveness of support for research and innovation as regards both the region and the collaboration between different players and Brussels has been designated among the various Belgian entities to be the pilot of the research presidency.

The basis for STI policy was initiated since the early 2000s with the creation of the Science Policy Council in 2000 and the adoption of the ordinance of 21 February 2002 on the encouragement and the funding of scientific research and technological innovation, then by the development of the Institute for the Encouragement of Scientific Research and Innovation of Brussels (ISRIB) in 2003. This support has been strengthened considerably, as regards both budgetary resources and programmes and regulatory framework.

A first attempt to structure a regional research and innovation policy was made when the government launched, in the context of a broader 2005 agreement called Contract for Economy & Employment (C2E/CET – 2005 – Contrat pour l’Economie et l’Emploi/Contract Economie en Tewerkstelling), a Regional Plan for Innovation (PRI/GPI - Plan Régional pour l’Innovation/Gewestelijk Plan voor Innovatie).

The representatives of the social partners, the academic community and government parties signed the PRI/GPI on 18 December 2006. The aim was to implement a set of coherent measures intended to improve the capacity for innovation of the Brussels-Capital Region. The six strategic targets of the PRI/GPI are:

- Target 1: Promote the three most innovative sectors: ICT, health and the environment by strengthening the ‘clustering’ approach in these sectors;
- Target 2: Increase the rate of innovation through the implementation of specific programmes;
- Target 3: Stimulate the use of innovation through marketing research results and assistance to small enterprises so that they assimilate and use innovations;
- Target 4: Foster the internationalisation of innovation;
- Target 5: Attract and anchor innovative activities;
- Target 6: Create an environment that favours innovation.

These objectives were made operational through the introduction of new instruments of support and the consolidation of existing ones. Moreover, the strategy is focused through the selection of ICT, health and environment as the three priority sectors on which the resources available to the institutions responsible for research support were focused. These sectors were selected because of the identified potential as regards research, innovative content, growth and job creation in Brussels.

Given the growing awareness of the importance of research and innovation for the regional economy and the acceptance that the regional authorities should act as a motor, the government has progressively devoted an increasing budgetary share to research and innovation. This trend has been evident since 2004 witnessed by a significant growth in the regional budget devoted to research, increasing from €22m in 2004 to over €37m in 2009, representing an increase of more than 50%.

FIGURE 38 Initial public budgets for R&D in Brussels-Capital, 2004-2009 in million €

2004	2005	2006	2007	2008	2009
22.298	26.046	29.829	35.480	37.535	37.382

Source: ISRIB

To this 'strict' research budget should be added the other budgets that are used to support research and innovation; such as the budget for incubators for which more than €30 million was invested between 2004 and 2008 in the development and the operation of infrastructures offering young innovative companies an environment conducive to their development from both material and intellectual perspectives.

In parallel to the increase in financial resources, an effort was made to create an updated and clearer legal framework of the various forms of support for research and innovation actors; including a thorough revision of the regional ordinance for the funding and encouragement of scientific research (ordinance of 21 February 2002, revised in 2008). At the time of writing, the implementing measures of this ordinance are not yet all approved but there is little doubt that they are moving in the same direction taken in recent years by other mechanisms to assist companies (economic development, export support, etc.), namely rationalisation, coherence and administrative simplification.

To complete the strategic overview, the 'research' budget is supplemented by other budgets that contribute to improving the general environment for research and innovation. This is especially the case of aid for business investment from which a large number of Brussels companies benefit or of export incentives for companies, including those active in research. To this regional support should be added on the one hand private investment and, on the other, French and Flemish community programmes and investments and Federal State measures, especially fiscal subsidies.

The years 2009 and 2010 were pivotal in the context of aligning the Brussels legal framework (of 21 February 2002) for encouraging and financing scientific research and technological innovation to the Community Framework for State Aid for Re-

search and Development and Innovation⁹⁵. The range of available aid is being, or will soon be enriched, by new measures and extensions to existing measures for industrial research and for experimental development, aid for process and organisational innovation, aid intended to cover the costs for intellectual property rights, aid to young innovative companies, aid for international partnerships and aid for temporary hiring of R&D personnel. In order to implement these additional measures, a new legal framework was adopted by the ordinance of 26 March 2009 concerning the promotion of research, development and innovation

5.2

Actors and instruments of STI policy in Brussels-Capital Region

The two highest public authorities of the Brussels-Capital Region are the Parliament and the Government, jointly responsible for defining the policies to be adopted in the context of the region's fields of competence. Since the election of a new government in 2009, the minister in charge of Economy, External trade, Employment and Scientific Research of Brussels Capital is competent for STI matters, even if the word innovation is not explicit in his portfolio

5.2.1

Science Policy Council of Brussels-Capital Region

Created on 10 February 2000, by a parliamentary ordinance, the members of the SPCBCR⁹⁶ are drawn from the academic community, on the one hand, and from the social partners (employers associations and trade unions), on the other. The ten academic members are selected based on own proposals of each academic institution. The trade unions and employers federations propose five members each for approval by the government. The meetings of the council are also attended by observers representing the regional ministers and secretaries of state, and by two experts from collective research centres (appointed by the government).

95. European Commission Communication – EU O.J. 2006/C 323/01 – 30.12.2006

96. Further information on the Science Policy Council can be found (in Dutch or French) at http://www.irsib.irisnet.be/CPS/cps_index_fr.htm

The council is the advisory body of the regional Government for the design of its science policy. In line with regional objectives, the activities of the SPCBCR are structured in three main strands:

- Advising the government and parliament in strategic decision making
- Assisting the Government in designing measures that respond to the concerns of the players at the grass-roots level
- Evaluating the effectiveness of the regional policy.

The SPCBCR has no operational role and is politically independent and, hence, provides a representative forum for strategic thinking on STI. Its positions are delivered through own-initiative opinions or, further to a government request, recommendations on issues connected to research and innovation in Brussels. In addition, it contributes to inter-regional cooperation through regular contacts with the counterpart councils from the two other regions and of the FCSP (to which two members of the SPCBCR are nominated by the Government).

5.2.2

Government departments and agencies

The Ministry of the Brussels-Capital Region is the main body used by the Government to implement its policy. The Ministry has competence in many different areas and is structured in six separate administrations. Five of these administrations have competence in specific areas, the sixth provides organisational and management support.

Additionally, the Brussels-Capital Region often entrusts public utility missions to a variety of pararegional bodies and non-profit making organisations of regional interest. This is the case for STI policy, where the main agencies are the regional agency ISRIB (see 4.5.2.1) and non-profit organisations of regional interest: Brussels Enterprise Agency (BEA, see 4.5.2.2) and Research in Brussels (RIB, see 4.5.2.3).

The Ministry of the Brussels-Capital Region continues to manage two specific subsidies that support innovation and business development:

Recruitment subsidy for companies (Article 123)

This regional employment grant is awarded to companies that employ between three and 100 workers and that meet the SME criteria, as defined by the European Commission. In addition, to a number of other conditions, the recruitment may, in particular, have the goal of 'studying or research with a view of the development of considerably improved or new products or processes.' The aid granted is equivalent

to 90% of the salary and social charges for the first year and to 75% for the second year. The employer must hire fully unemployed workers who are on receiving unemployment benefit (or related benefits)⁹⁷.

Regional aid for economic expansion

Although not reserved exclusively for innovative companies, aid for business investment (capital, subsidies or exemption from property tax) may be attributed to SMEs that invest in know-how in the Brussels-Capital Region. Know how is defined as ‘the purchase or the deposit of patents, brands or designs as well as the cost of staff and supplies aimed at improving the technical knowledge of the company, in particular as regards research or development of prototypes, products or new manufacturing processes’. The aid intensity granted depends on three factors: the size of the company, the location or not in a development zone and criteria related to employment. Moreover, additional percentage points of aid intensity may be awarded to companies that fall within strategic sectors, including in particular ICT and R&D.

5.2.2.1

The Institute for the Encouragement of Scientific Research and Innovation of Brussels (ISRIB)

Since 2004, the Ministry of Brussels-Capital Region no longer has a department with responsibility for research and innovation. Instead, a public agency, answering directly to the regional minister with responsibility for scientific research, has been created to manage the implementation of the regional policy in favour of research and innovation. Established on 1 July 2004, the ISRIB⁹⁸ is the cornerstone of the regional financial support system for research and innovation. The missions of the agency, set out in an ordinance of 26 June 2003, are:

- the encouragement, financial support and commercialisation of scientific research and technological innovation in accordance with regional policy;
- communication on science policy issues;
- representing the Brussels-Capital Region within various STI related organisations or committees;
- the provision of statistical indicators and information to Brussels research actors;
- and the management of scientific research projects with an international scope.

To these ends, the ISRIB manages various funding measures aimed at universities and companies, including support for technology transfer.

Since 2008, the ISRIB became completely independent of the regional ministry and manages the entire regional budget for research and innovation, as well as its own

97. http://www.bruxelles.irisnet.be/fr/region/region_de_bruxelles-capitale/ministere_de_la_region_de_bruxelles_capitale/competences_et_organisation/economie_et_emploi.shtml

98. <http://www.irsib.irisnet.be/> IRSIB in French and IWOIB in Dutch.

operating budget (staff and overheads)⁹⁹. In 2010, the institute had 24 members of staff, of whom 12 have a scientific background. The institute is structured in two departments: scientific and administrative. The former is responsible for managing the calls for project proposals, their evaluation and selection based on objective criteria, and, finally, an effective and continuous monitoring of the funded projects.

Aware of the lack of sufficient resources devoted to research and innovation, particularly from the perspective of the objectives set by the EU's 'Lisbon Strategy', the Brussels authorities have taken steps to remedy the situation. A significant effort has therefore been made over the past few years to increase and improve not only the financial but also the human and regulatory resources intended to support research.

The backbone of this support is managed by the ISRIB through funding of projects submitted by both companies and universities and colleges of higher education located in the region. The ISRIB provides not only financial support but seeks to provide an adequate follow-up of the funded projects. Over the last 5-10 years, various measures have been launched which can be classified into three categories:

- support to companies,
- support to universities;
- and support to technology transfer.

Most of these measures are implemented following a similar process: calls for proposals (annually or more frequently), evaluation and selection of proposals by the expert juries or by experts at ISRIB depending on the programme concerned, scientific and financial monitoring of the selected projects.

One exception, created in 2008, is related to micro-projects (with a duration of between three and nine months) led by innovative micro-businesses or SMEs whose projects may be introduced at any time. This more flexible and especially faster formula corresponds better with the expectations of small enterprises, which form a significant part of the economic fabric in Brussels.

The ISRIB represents the regional authorities in various types of meeting (information, steering committees, monitoring committees, intra-authority consultation, etc.) and negotiations in the field of research and innovation at regional, federal (CIS, CFS, CEI), European (COST, Eureka, ERAC, etc.) and international (OECD) levels. The ISRIB is also the regional 'NCP' responsible for disseminating information on the thematic programmes and calls of the EU's FP7.

99. In 2008, the operating budget of the ISRIB was approximately €1.8m: €1.3m in staff costs and €0.5m in operating costs (Annual Report of the ISRIB 2008).

BOX 32 **Regional impulse programmes**

The objective of the impulse programmes, in the three priority innovative sectors (ICT, health and environment) identified by the PRI/GPI, is to strengthen the technological potential of the region. In particular, the programme aims to foster technology transfer between basic research and industrial research actors.

This programme is open to universities as well as colleges of

higher education and collective research centres located in the Brussels-Capital Region that submit a collaborative project. Projects are selected by a jury of scientific experts and industrialists with regional know-how.

To encourage cooperation between institutions and networking of research teams that have achieved a good level of excellence, the research must be carried out by at least three to four research teams that belong to two or more

different institutions. Three programmes have been launched to date: ICT in 2006, life sciences in 2007 and the environment in 2008.

The impulse programmes are one of the most significant budgetary efforts for research as the amount available for each programme is €7.5m per year, providing projects with 100% funding for a period of three years (renewable for a period of three years).

Impulse programmes 2007-2009

YEAR	THEME	PROJECTS SUBMITTED	PROJECTS ACCEPTED	AMOUNTS GRANTED (€MILLION)	NUMBER OF TEAMS	FTE
2007	ICT	7	4	6.7	18	22
2008	Life Sciences	27	5	7	21	27
2009	Environment	17	6	7.5	21	28
TOTAL		51	15	21.2	60	77

BOX 33 **Brains back to Brussels (BB2B)**

The programme aims to encourage mobility of researchers and exchange of knowledge and is the longest-standing programme of the Brussels-Capital Region, dating from 1990. Originally named 'Research in Brussels', the programme was rebranded 'Brains back to Brussels – BB2B' programme in 2007. The initial RIB programme, based on an annual call, only funded projects carried out by foreign researchers under the direction of a promoter within regional research units at universities or colleges of higher education. The RIB programme led to 206 high-level researchers being hosted in the region (from

neighbouring as well as more far-flung countries such as Algeria, Argentina, Canada, Congo, India, Israel, Russia and USA).

The new 'BB2B' programme is designed to bring talented researchers (Belgian and foreign) (back) to Brussels to strengthen the region's image as a centre of excellence by contributing to the improvement of the quality of research carried out in the universities in Brussels. The researchers funded should bring with them new know-how and techniques to the host institution, enabling it to gain increased international recognition and

access additional national or European funding.

The research projects that receive financial support need to prove that they are likely to contribute to the socio-economic development of the region. Two categories of projects are eligible for funding depending on the profile of the researcher:

→ Establishment projects seek to attract a researcher, of any other nationality, who is on a post doctoral stay abroad for at least two years, to return to Belgium. An 'establishment project' receives funding for a period of three years and is

renewable for another two years.

- Short-term visit' (ex-'Research in Brussels') comprises two profiles: the first concerns researchers established abroad and holding a PhD who are

funded for a stay in Brussels lasting 10 to 12 months; the second is open to post-doctoral researchers with an outstanding CV implying that the researcher has authored several scientific publications in specialised and

reputable journals, and is recognised within the scientific community as a specialist in the field. In this case, the short-term research grant covers a stay of duration of three to nine months.

The first edition was launched in 2008.

YEAR	CATEGORY	NUMBER OF PROJECTS	BUDGET (IN € MILLION)
2008	Cat. 1 (3 yrs + 2 yrs)	5	1.9
	Cat. 2 (3 to 12 months)	8	0.3
2009	Cat. 1 (3 yrs + 2 yrs)	5	1.8
	Cat. 2 (3 to 12 months)	9	0.36

BOX 34 Spin-off in Brussels

Launched in 2006, this programme aims to encourage the transfer of basic research results into concrete applications with a view to creating new companies (spin-offs) in the Brussels-Capital Region and thereby develop the regional economy. It addresses both academic spin-offs (universities and colleges of higher

education) and industrial spin-offs (companies and collective research centres).

Funding is granted for a two-year period, which may be extended by two years for an academic spin-off and by one year for an industrial spin-off. The funding covers, in addition to the salary for an

'enterprising researcher', the operating and training costs (the most common in entrepreneurship) as well as support costs (preparation of the business plan, for example). The 'enterprising researcher' is expected to receive training and coaching by a promoter, an industrial sponsor and a liaison officer from ISRIB.

YEAR	PROJECTS SUBMITTED	PROJECTS ACCEPTED	AMOUNT GRANTED
2006	8	4	€422,988
2007	14	6	€999,992
2008	11	5	€909,948
2009	9	7	€1,308,080

Subsidies or reimbursable loans for applied research projects

In line with the EU's State Aid framework for R&D and innovation, industrial research (R projects) and pre-competitive development (D projects) are distinguished from each other in the regional direct financial support instruments. The level of support granted varies depending on the size of the enterprises (large, SMEs), the existence or not of co-operation with university laboratories, and where applicable, the transnational character of the project (Eureka, Eurostars, etc.). More than 300 projects have been supported since 2000.

The ISRIB selects projects for grant aid within the limits of available budgetary appropriations and according to the following criteria (Regional Order of 18 July 2002):

1. the innovative character of the project;
2. the scientific or technological risks to overcome;
3. relevance and realism of the work-programme;
4. competence of the R&D team;
5. interest of the project in terms of the industrial and/or commercial strategy of its sponsor;
6. the prospects for achieving the results;
7. the potential impact of the results on the economy, employment and the environment of the Brussels-Capital Region;
8. the capacity of the sponsor to finance their part of the costs related to the execution of the proposed programme of work.

Feasibility studies and aid to isolated inventors

Only SMEs are eligible for financial support for feasibility studies. A subsidy may be granted by the ISRIB to a company for a preliminary technical feasibility study prior to launching an R&D project. The study should be carried out by a specialised organisation (university, college of higher education, collective research centre) and the scale of the subsidy will depend on the type of project (R or D). Furthermore, the ISRIB also finances from 50-75% of the costs (with a ceiling of €125,000) for technical feasibility studies for inventions by individual inventors, officially resident in the region, if such a study is entrusted to a specialised organisation.

Filing and maintaining patents

Support for patenting is a long-standing measure, whereby the Brussels-Capital Region subsidises costs for filing and maintaining patents. The level of subsidy depends on the type of project (R or D). Filing and maintaining patents from results obtained in the context of a R&D project that received regional funding may be awarded a subsidy at the rate of 35-80% of the costs of these operations for a R&D project. The duration of the intervention is limited to three years from the date of submission of the grant demand. This subsidy is reserved exclusively for SMEs.

Prospective Research for Brussels – PRFB

Since 2000, the PRFB programme has financed projects, led by researchers, in fields deemed essential for the region. The objective is to encourage the development, within the Brussels region, of skills platforms in regional areas of interest, like mobility, multiculturalism, environment, employment, housing, and so on. A professor or researcher from a university or a college of higher education may submit a project proposal. A monitoring commission reviews the selected projects, grouped according to themes, annually.

The research themes that have been retained relate to all the fields of competence of the region. In 2009, for example, the eligible fields of research were the following:

- Mobility
 - Which activities for the port of Brussels (logistics, industrial activities, etc.)?
 - Analysis of use of modes of transport by commuters, residents of Brussels, etc.
 - Impact of mobility on economic activity in the region.
- Environment: biodiversity and urban environment.
- Urban and demographic development: how to adapt/anticipate urban planning to population trends, notably public infrastructure (child-care, transport, schools, etc.), housing and real estate market, employment zones.
- Economy
 - Informal economy (undeclared employment, prostitution, etc.)
 - Social economy: state of affairs and perspectives
- Socio-economic impact of research activities

Within these themes, the researchers are free to develop specific research topics.

There are two eligible researcher profiles:

- Profile A: young researcher (max. 30 years old) and holding a PhD (2 years, renewable for 2 years)
- Profile B: experienced post-doctoral researcher (2 years, renewable for 1 year).

The subsidies cover the researcher's salary, operating costs of the host laboratory and administrative costs for the institution.

FIGURE 39 PRFB, 2004-2008

YEAR	NUMBER OF PROJECTS	AMOUNT GRANTED (IN € MILLIONS)	FTE / YEAR
2004	31	2.9	55
2005	25	2.9	55
2006	23	2.6	48
2007	22	2.7	45
2008	27	2.9	49

Source: ISRIB

5.2.2.2

The Brussels Enterprise Agency (BEA)

In terms of support to innovation in enterprises, the Brussels Enterprise Agency (BEA)¹⁰⁰ is the main organisation, resulting from the merger in 2003 of two previous economic development agencies: Technopol and Ecobur. The BEA offers companies a one-stop shop for all information they need to establish or operate a business in the Brussels-Capital Region, including for innovation. Its mission is 'to be the leading public entity for business people (entrepreneurs, company founders, firms SMEs, the self-employed, and foreign investors) in the Brussels-Capital Region'. The BEA has four departments: 'economy and start-ups', 'technology and innovative projects', 'international relations' and 'town planning and environment'.

In terms of support for innovation, the BEA offers two types of actions:

- collective actions that are underpinned by a cluster strategy: networking, internationalisation, visibility, common projects, technology watch, thematic seminars, technological or commercial missions, and so on in six sectors: food, environment, eco-construction, health, ICT, fashion and design;
- facilitating the start-up and growth of innovative projects: checking the technological and competitive position, optimising the business model, search for strategic partners, financing, mobilising public support notably for R&D and innovation.

The BEA is also a part of the NCP network of Brussels to assist companies and research centres to benefit from EU subsidies for R&D in the framework of FP7. With the BECI (Chamber of Commerce Brussels Enterprises, Commerce and Industry), the BEA is also the contact point in Brussels for the EEN focusing on assisting companies to develop internationally and to establish collaborative efforts with foreign partners.

5.2.2.3

Research in Brussels (RIB)

RIB¹⁰¹ is a non-profit organisation founded in November 2007 by the Brussels-Capital Region. It reports to the ISRIB and ultimately to the Minister for Scientific Research. RIB is a not-for-profit organisation responsible for promoting scientific and technological research in Brussels. In this context, it:

- passes on information on all noteworthy activities, possibilities, subsidies and initiatives in Brussels;
- participates in activities to raise awareness amongst young people;
- carries out studies on the state of research;

100. <http://www.abe-bao.be>

101. <http://www.rib.irisnet.be>

- provides support to regional players;
- improves the Domaine Latour de Freins¹⁰², the ‘flagship’ location for research in Brussels.

RIB also seeks to promote Brussels research on the European and the international stages. Moreover it takes charge of the entire operational aspect of European cooperation agreements and projects. During the 2010 Belgian Presidency of the EU, the ‘research’ theme is coordinated by the Brussels-Capital Region and RIB will manage all events (council meetings, conferences, colloquia, receptions, etc.).

BOX 35 Brussels Studies

Since 2006, Brussels Studies¹⁰³ has operated as an electronic scientific journal with a wide circulation that allows universities to disseminate the results of their research related to the realities of Brussels and offers its readers articles that allow a non-specialised public easy access to information related to important subjects being studied and debated in the academia.

Brussels Studies thus favours the intervention of scientific research results in the public debate concerning Brussels. To do so, the journal publishes articles in PDF format, in French, Dutch and English that can be downloaded easily and for free from its website.

All university disciplines and all themes are accepted. A large amount of research carried out in the context of Prospective Research for Brussels is published in Brussels Studies.

5.2.3

Innovation intermediaries

5.2.3.1

University Interfaces

The universities and colleges of higher education, located in Brussels, have created research-industry interface structures to commercialise their scientific and technological potential and to benefit economic activity in the region.

The mission of these interfaces is to promote and facilitate collaboration between the university and external partners (government authorities, companies, social and cultural sector, etc.) in matters of scientific services, R&D, commercialisation of research results and participation in local and regional development. They play a dual role as leader and coordinator of the activities concerned, and function as adviser and support to the university teams and their external partners.

102. <http://www.latourdefreins.be> A castle of the 19th century where RIB and ISRIB are located. The castle has become the rallying point of the research community of Brussels, the location of identity of Brussels research. The area has retained its unique charm of the past while firmly embracing the future. Its infrastructure, with a park of 6 hectares, covered terraces, and conference rooms offer an ideal framework for the organisation of events. The castle also offers apartments and flats to mobile researchers and their families.

103. <http://www.brusselsstudies.be>

In Brussels, there are four interfaces¹⁰⁴: three are university dependent (ULB, UCL and VUB), the fourth, Indutec, is connected to the four higher education institutes in the Brussels-Capital Region (Haute Ecole Léonard de Vinci/Institut Supérieur Industriel ECAM, Haute Ecole Paul-Henri Spaak/Institut Supérieur Industriel/ISIB, Haute Ecole Lucia de Brouckère/Institut Meurice and Erasmushogeschool Brussel).

BOX 36 Incubators in the Brussels-Capital Region

An incubator is a real estate structure connected to a university or a college of higher education and whose goal is to house, under financially favourable conditions, university spin-offs or other innovative start-ups from scientific research. In this way, small enterprises benefit from provision of offices and laboratories that have fully integrated services and from customised managerial and technological support as well as in-depth support in all areas of company management, in the areas of technology validation, finding capital, subsidies and financing, and so on. Currently, the Brussels-Capital Region host six technology incubators:

→ EEBIC (Erasmus European Business & Innovation Centre) located in Anderlecht near the Erasme Hospital and the

Erasmus science park.

<http://www.eebic.be/>

→ Eurobiotec Brussels SA, created in 2005 and specialising in the biotechnology sector.

<http://www.eurobiotec.be/>

→ ICAB (Incubatiecentrum Arsenaal Brussel), connected to the VUB, opened its doors on the Arsenal site at Etterbeek in 2008. The incubator houses and supports entrepreneurs who wish to create a company in the ICT sector. <http://www.icabrussel.be/>

→ The UCL incubator, which accommodates R&D companies, chiefly active in the fields of human health and oncology, will soon be reinforced by the creation of BLSI, Brussels Life Sciences

Incubator. www.parc.ucl.ac.be

→ Solvay Research & Technology opened to start-ups its largest R&D site (in Neder-over-Hembeek) where the start-ups are offered access to R&D facilities, the support they need for their activity, particularly favourable accommodation for a two-year period and this, in the framework of an agreement where the start-up retain full IP rights on its research. www.solvay.com

→ 3B-Brussels Business Base Plug & Play incubator (Tweebeek) offers temporary accommodation for spin-offs that benefit from the technological and managerial support of the incubator, university or college of higher education that supports their project.

104. <http://www.ulb.ac.be/rech/docs/ulbinter.html>; <http://www.uclouvain.be/374.html>; <http://www.vub.ac.be/english/infofor/researchers/technologytransfer.html>; <http://www.indutec.irisnet.be>

5.2.3.2

The SRIB and the SDRB

A regional company for investment (the SRIB-GIMB)¹⁰⁵ and a regional development company (SDRB-GOMB)¹⁰⁶ are the two regional agencies that complete the list of key players. The SRIB funds a large number of innovative company projects while the SDRB, through its many actions, helps companies find a location adapted to their needs, which can prove to be particularly difficult in the urban context of Brussels. Historically, it developed and managed the first science parks in Brussels and, besides this 'classic' mission, the also oversees the development of the various incubators in Brussels.

5.2.4

Main research and innovation performers

The Brussels-Capital Region is an important natural crossroads for future technologies of a European knowledge-based society as the region offers true economic, institutional and scientific synergies. The region hosts numerous universities and higher education colleges as well as many of the federal scientific establishments and other sectoral research organisations. As noted above, due to the structure of the country, HEI fall under the competence of the communities and those located in Brussels have already been presented in previous sections.

5.2.4.1

Collective Research Centres

Over the last few years, the Brussels-Capital Region has focused financial support for collective research centres on key issues faced by regional companies. Funded on a project basis by the ISRIB, there are three such centres located in Brussels:

- Brufotec¹⁰⁷ was created in 1997 to assist Brussels-based SMEs in the agro-food sector to set up and respect the rules on food hygiene and security, and the environment.
- SIRRIS¹⁰⁸ is a centre of expertise in the field of software engineering and technological assistance for companies in the Agoria sector. Sirris helps companies in the implementation of technological innovations, enabling them to strengthen their competitive position over the long-term. Experts visit companies on site, offer them technological advice, launch innovation paths, and provide guidance until they reach the implementation phase. It also developed the 'Mistral' programme devoted to micro, small and medium-sized industrial

105. <http://www.srib.be>

106. <http://www.sdrb.irisnet.be>

107. <http://www.brufotec.be>

108. <http://www.sirris.be>

firms by offering strategic innovation support to allow companies to increase their innovative potential.

- The Belgian Building Research Institute (BBRI)¹⁰⁹ provides guidance related to eco-construction and sustainable development. In addition to offering information services, direct aid and training courses. BBRI has three main missions: to perform scientific and technical research for the benefit of its members, to supply technical information, assistance and consultancy to its members and to contribute in general to innovation and development in the construction sector in particular by performing contract research upon request of the industry and the authorities. To fulfil its mission BBRI pools the expertise of some 200 highly skilled and motivated staff with widely varying educational background, allowing the creation of multidisciplinary teams as required by the problems to be dealt with.

5.2.4.2

Clusters

The cluster strategy preceded the definition of an innovation policy in Brussels. In 2005, the C2E foresaw, notably, the need to concentrate available public resources for innovation on three priority sectors: new ICT, health and the environment. This objective of the Government was then translated operationally in 2006 in the regional innovation plan, which gave the BEA a mission to create and animate clusters of innovative enterprises in each of the sectors.

In a region where the tradition of collective action is less strong than in the industrial heartlands elsewhere in Belgium, the clusters were conceived as a form of business club, aiming to foster co-operation and exchanges between members, and subsequently enlarged to other partners as needs or opportunities were identified. Given the limited scale of the industrial sector in Brussels, there are very few sectors where the entire value chain is present in the region. Hence, the BEA, from the beginning, favoured an horizontal approach that brought together business with a growth potential with similar activities.

As a result, four clusters were gradually developed: a BioPharma¹¹⁰ cluster, a tele-medicine cluster, a software publishing cluster¹¹¹ and a cluster focused on the environment and, notably, green building called Ecobuild¹¹². The latter, contrary to the first three, has adopted a vertical value chain approach bringing together various professions, since the sector in Brussels is relatively complete covering all fields of construction and related professions. Ecobuild has signed co-operation agreements with the Walloon Eco-construction and Cap 2020 clusters.

109. <http://www.bbri.be>

110. <http://www.biotechninbrussels.be>

111. <http://www.itscan.be>

112. www.brusselsgreentech.be

The objectives pursued by the clusters are to increase the visibility of their members, and in this way to reinforce the innovative image of the region, and promote the international development of the clusters and their members. The activities carried out include the development of websites presenting directories of clusters members, joint stands at major sector events (Bio USA, Medica, Cebit, MIPIM), inter-regional partnerships through programmes such as INTERREG, study missions, activities within the EEN on technology transfer, business development, etc.

5.3

Perspectives for STI policy in Brussels-Capital Region

Over the two decades since the creation of the region, the focus of attention in STI policy, as in other fields, was to develop the budgetary means, legislative framework and support measures. The system has now reached a level of ‘maturity’ and it is time to look forward and reflect on how to further optimise policy and adjust and align it with the evolving needs of the actors in the regional innovation system. A key question that is constantly reflected upon is, of course, the place of research in a region like Brussels-Capital. In a range of recent documents and debates there are certain common themes that emerge: research and innovation are essential for the overall development of Brussels and the region has all the basic requirements to become a leading city of knowledge. The issue, then, is how can the development of research and innovation be fostered and how can the benefits for the regional economy and the population be maximised?

The issues and future options discussed by the regional STI stakeholders suggestions may be divided into two subsets: the tools for support and the strategy to be followed.

Most of the stakeholders express a favourable opinion on the measures to support research and innovation that have been implemented by the regional authorities over the last few years and they stress the professionalism, conscientious approach and the rigour of the process and outcomes. As an example, during the discussions on the mobility of researchers at the European Commission, which gave birth to the ERA-MORE network (EURAXESS – Researchers in motion), the Brussels’ programme ‘Research in Brussels’ had been presented as a good practice.

Nonetheless, the overall satisfaction with progress made should not obscure areas where further improvements can be made:

- The administrative procedures are often deemed burdensome and (too) long, especially for smaller companies that struggle to find the necessary human resources.
- the multiplicity of players likely to intervene during an innovation project is sometimes perceived as a source of confusion.
- The definition of a clear vision of the objectives being pursued and the role of research and innovation in Brussels still need to be refined, in the same way the strategy being pursued needs to be deepened more generally.
- These issues are similar to those expressed about policy systems in other EU Member States or for the EU's own instruments for research and innovation; and hence the reflection taking place in Brussels is done in parallel with that at European level.

In short, while the mix of policy measures available to support research and innovation is satisfactory, improvements are needed to render them even more effective, namely:

- the pursuit of budgetary and regulatory efforts is indispensable. The regional budget for research and innovation has followed a positive trend between 2004 and 2009, however, there is now concern about how feasible it will be to maintain this financial effort in a difficult economic context.
- In addition to the budget, all stakeholders stress the need for a clear regulatory environment and an effective administration to implement it.
- Enhanced coherence and synergies between regional policies for research, economy and employment, environment, and so on, is required.
- at the level of delivery of policies, there is also room for better overall consistency and coordination of support services. For example, there is a need to further coordinate training programmes with the needs of innovative companies seeking a good quality workforce and thereby create employment that benefits the inhabitants of Brussels.

There is also need to pursue the effort begun on the promotion and improved awareness of the importance of research and innovation. On the one hand, more information needs to be disseminated on the support measures for research and innovation, and on the other, an enhanced visibility of innovative work being carried out in Brussels, whether in companies or in universities and colleges of higher education, would be welcome.

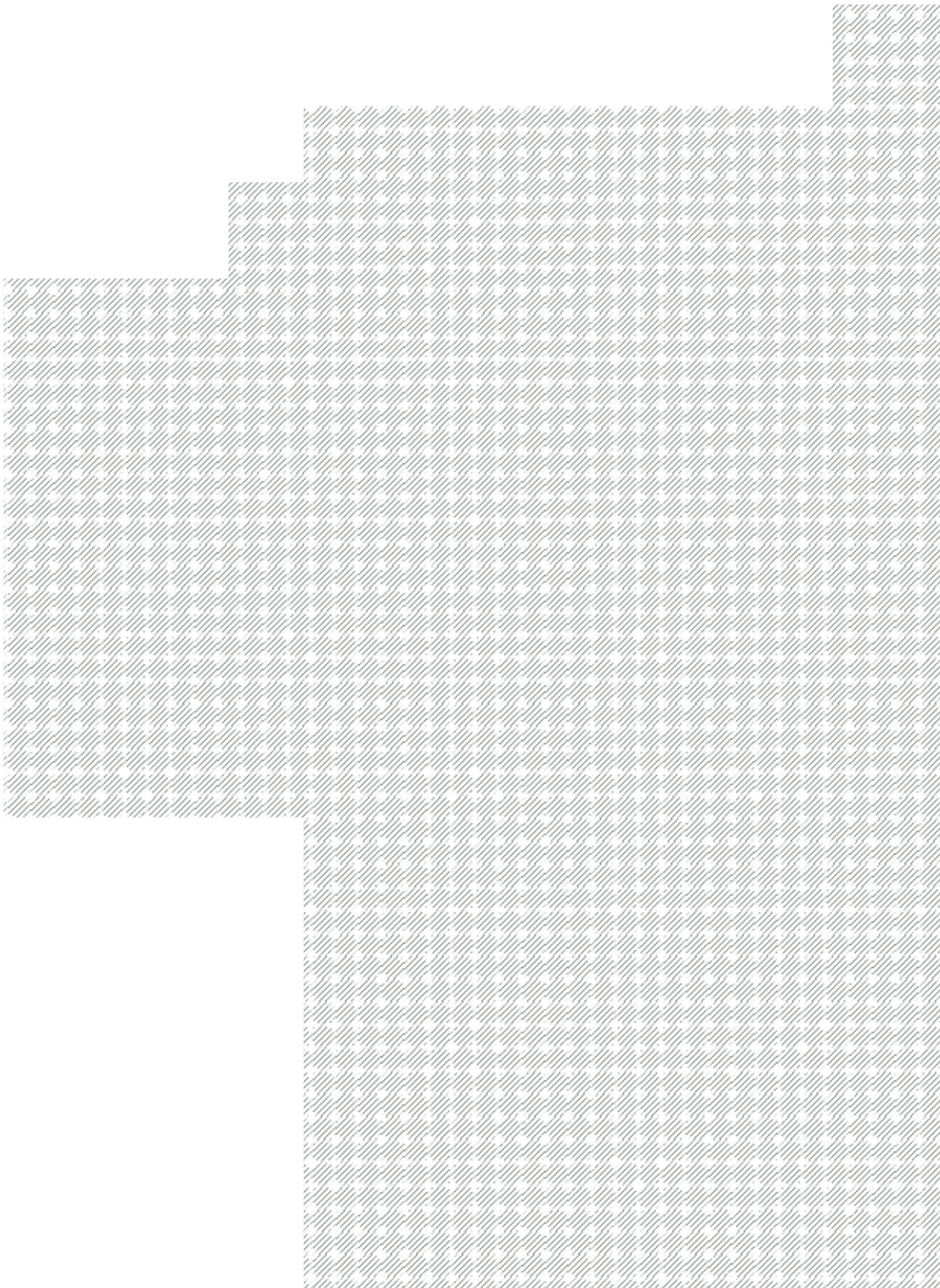
A final issue is the lack of adequate tools to follow up the effects of the Brussels-Capital STI policy, especially statistically. This makes it very difficult to evaluate the research potential of Brussels and its consequences in terms of creation of wealth, employment and well-being. It is equally a key problem when it comes to evaluating the effects, direct and indirect, of the support measures. The SPCBCR has issued recommendations

taking into account the general discussion about ERA indicators and monitoring which took place in ERAC, etc. The development of strategic intelligence tools is required to measure the effectiveness of policy and contribute to developing a strategic vision for research and innovation in Brussels based on objective data.

The development and the implementation of an overall and integrated strategy for research and innovation in Brussels is without doubt the challenge to be met over the next few years. Taking into account the urban specificity of Brussels and the structurally difficult budgetary situation, it is essential to use the available means in the best way possible. In this context, it is essential to define an ambition, a role to play and objectives to achieve for research and innovation. To do so, it will likely be necessary to develop the potential identified in research in the context of the regional objectives of growth and prosperity for everyone in Brussels.

Having established a well-defined regional STI policy framework, institutions and measures, Brussels is seeking to definitively 'jump on the train' of European programmes and initiatives by further boosting its integration and participation in the main European research and innovation initiatives. Of course, Brussels has been participating for many years to all the most important European initiatives like the FP, the CIP, the Structural Funds, COST, EUREKA, EUROSTARS and so on. Brussels is also a co-founder of the network ERRIN (European Regions Research and Innovation Network) whose member work to support the three pillars of the Lisbon Agenda. Brussels is also active in the NEREUS network, the 'Network of European Regions Using Space Technologies'. Moreover, during the 2010 Belgian presidency, Brussels will chair the GPC dedicated group of the ERAC and pay special attention to the development of the joint programming initiatives and together with a priority focus on the framework conditions.

In conclusion, there is an expectation that the research and innovation projects supported by the regional authorities should contribute (directly and indirectly) to job creation and well-being, be based on a reasonable balance between public and private financing, and contribute to socio-economic development and medium-term recovery in a manner compatible with the urban context of the region. In line with the Europe 2020 goals of smart, sustainable and inclusive, growth, the regional authorities and stakeholders are committed to pursuing the current broadly effective and pragmatic STI strategy of the Brussels-Capital Region in the years to come.





**6.
CONCLUSIONS
AND
PERSPECTIVES**

Science, technology and innovation (STI) are at the core of all public policies. Without sound scientific research and advice, without the diffusion and application of advanced technologies in public administrations, schools and workplaces, and without new innovative products and solutions, society cannot hope to sustain economic, environmental and social well-being. At the beginning of this report, the question was asked as to why a reader would want to plunge into a presentation of the policies, institutions and initiatives of the Belgian authorities in the field of STI.

The answer lies not in the details of every initiative or in the ‘cloud’ of acronyms of the numerous organisations in the Belgian system. Rather, the Belgian STI policy story is that a decision-making system based on ‘multi-level governance’ can lead to the design and delivery of effective public policy. This is an important lesson in the context of efforts to create a well-functioning European research and innovation area.

Over the decade since the first BRISTI report, all the Belgian authorities have defined, developed, refined and above all pushed forward their policy in favour of improving support for researchers and innovators. While each authority has pursued specific actions or objectives and adopted solutions adapted to their specific institutional and constitutional role, the lessons for other European countries to be drawn from the Belgium experience lie in what could be termed the ‘commonality within diversity’.

Five ‘commonalities’ in the STI policies of the Belgian federal, regional and community authorities stand out from the preceding pages and can be summed up as follows:

- a policy commitment to maintaining the upward trends in public investment in R&D;
- an effort to structure and consolidate research and innovation potential;
- a re-orientation of funding measures towards co-operation and networking;
- a strong focus on improving opportunities and working conditions for researchers and innovation personnel;
- efforts to enhance the effectiveness of governance of research and innovation policies (strategies, target setting, broad-based partnerships, evaluation).
- A sixth, and somewhat newer trend, is the broadening of innovation policy to meet societal challenges and ensure that all policy instruments are being brought into play to strengthen the national innovation system.

In more detail, the six common trends in Belgian STI policy are:

1. Since the mid-2000s, all the Belgian authorities have made a significant budgetary effort to make additional means available for doctoral and post-doctoral training and researcher mobility, research and funding measures, research infrastructure and Belgium's contribution to international research programmes. This public 're-investment' in research and innovation is a clear sign of a real commitment to the EU's Barcelona Objective (3% of GDP spent on R&D). However, the investment made should not be considered as simply a reaction in order to 'meet a target'. The boost in public expenditure on R&D is under-pinned by a significant strategic reflection (the Brussels-Capital Regional Innovation Plan; Flanders in Action (ViA) plan and Pact 2020 in Flanders; Strategy, the Walloon 'Marshall-Plan', etc.) and a broad consensus of political, business and academic leaders on the priority to be given to boosting the 'knowledge triangle' in Belgium as a fundamental source of competitiveness and social well-being. Each of the authorities has set out their own targets and objectives reflecting a much wider 'innovation system' perspective than the current EU27 investment target. The form (direct subsidies, infrastructure investment, tax reductions, innovation advisory services, etc.) and the targeting of the additional public expenditure vary across authorities depending on their specific competencies and priorities. The Federal government has stepped up efforts to support regional and community policies through, notably, tax breaks to encourage people to pursue scientific careers and to attract innovative people (back) to Belgium. The regional governments have stepped up funding for enterprises, research centres and innovation intermediaries; while, the communities have refinanced the academic research base and stimulated researchers' mobility. The efforts will take time to bear fruit, although Belgium has broadly maintained or improved its position in international benchmarks of STI in the last decade, and there remains a need for strong political will not to cut back on public STI budgets despite the tightening of public finances post crisis.
2. The second 'commonality' is the shift to an even greater focusing and structuring of research and innovation potential. This trend is evident in the policies of all the authorities: through the Brussels regional innovation plan focus on three key innovation sectors; through the 'breakthroughs' of ViA and the 'spearheads' for technology and innovation of the VRWI strategic clusters; in Wallonia through the clusters and competitiveness poles programmes; at Federal level through thematic research programmes and the long-term investment in nuclear (the MYHRA project) or space research that makes Belgium the 'largest of the small countries' in the latter field. In addition to the strategic focusing at policy level, the last years have witnessed a reconfiguration of the Belgian STI landscape as universities and university colleges regroup (driven by the Bologna reform from an education perspective) and pool research potential, as research centres, businesses and academic labs come together in new forms of temporary or per-

manent strategic partnerships, as new institutes are created (e.g. CMI, SIM and NERF in Flanders or WELBIO in Wallonia) and existing ones are modernised (e.g. the Federal Scientific Institutions) or given a new financial footing (the 'collective' research centres). The leitmotiv is critical mass, not only from a regional or national perspective, but more particularly on the European and global level to ensure that Belgian teams continue to keep up with the pace in an increasingly competitive and integrated 'global market' for research and innovation.

3. A third common feature of policies is an increased emphasis on partnership and networking. This is evident in the emphasis placed on competitiveness clusters, strategic research centres, etc. in the STI strategies, but also in changes made in recent years to the procedures and selection criteria for funding of projects. In many programmes, an obligation has been introduced for joint proposals or mixed teams (from universities, collective research, enterprises, etc.); in new schemes like innovation vouchers aimed at stimulating demand for services by enterprises from universities or research centres. By analogy, there is a push to open regional/community policy initiatives to partners from other parts of Belgium. As an example, competitiveness poles in Wallonia are being opened to participants from Brussels-Capital, and there are plans to explore opening or joint calls with French competitiveness clusters. Likewise, in Flanders, most IWT R&D support measures are open to co-operation with entities from other Belgian regions or abroad. The federal IUAP measure is evidence of the continued interest of academic research teams from the different communities/regions to work together across institutional and territorial boundaries. Hence, the EU level concept of joint programming and the idea of the ERA finds a natural echo in Belgium, where the principle has already been applied for several years! The participation of the Belgian authorities in ERA-NETs or the successful performance of Belgian participants in the EU's 6th and 7th FP for RTD, in JTI, COST, EUREKA and the newly launched KICs of the EIT are a witness to the country's willingness to play its part in the development of the ERA.
4. Research and innovation is not about abstract technology and Belgian policy has recognised the key importance of the 'human touch' over the last decade. All Belgian authorities have played their part in improving the environment for educating and training new scientific, engineering and technical experts, in promoting scientific careers, in encouraging skilled and highly trained people to stay in Belgium as well as to pursue training or careers abroad or to come to Belgium to pursue R&D and innovation projects. A raft of measures from federal tax breaks for recruiting R&D staff, to community measures implementing the European Partnership for Researchers agenda, to regional funding for mobility of innovative people between research and industry are all evidence of the importance given to 'investing in people'.

5. It is hoped that this report will have helped both the non-Belgium and indeed national, reader to understand better who does what in Belgian STI policy, how competencies are distributed and which are the main policy measures, priorities and budgets. Nevertheless, the federalised nature of the country lends itself by nature to the risk that no single authority can pull all the ‘policy levers’ required or that some fragmentation of effort in specialised scientific or industrial research fields may occur. A particular attention to ‘governance’ is therefore not unsurprisingly a feature of policy debates in Belgium. This is first and foremost visible in terms of the action of each of the individual authorities to optimise and modernise their own specific institutional structures, in the context of their own policy priorities. This has included the creation in Brussels-Capital of a legal framework and an agency to deliver funding for research and innovation; in Flanders by the re-organisation of the government departments responsible for economic, research and innovation, the reinforcing of advisory councils, the fusion of agencies supporting entrepreneurship and the networking of innovation actors through the key VIS programme; in Wallonia by a similar merger of government departments and by the creation of two agencies to structure and professionalise regional and sub-regional innovation and business development organisations; and at Federal level by the modernisation of the scientific institutions or the creation of specialised units supporting IPR, etc. There has equally been an attention to improving ‘processes’ and strategic intelligence with policy-making driven by increased consultation with broad-based partnerships, investment in policy research (e.g. the Flemish policy research centres) and increased efforts to evaluate the impact of policy (by all the authorities).
6. Finally, in line with ‘global’ trends and in conformity with the newly stated objective of ‘smart, sustainable growth’ laid out in the Europe 2020 strategy, there is clear evidence of policy attention being given by the Belgian authorities to a ‘broad-based’ approach to innovation policy. This can be seen through the linkage to ‘education and training’ made in policies such as competitiveness clusters, to an attention ‘open innovation’ (e.g. Walloon Region funding under the Marshall Plan for ‘open innovation’ projects), to addressing societal challenges and integrating research and innovation into regional policies, examples include: a focus in Brussels on mobility and transport issues; public procurement as driver for innovation (Flanders is active in pioneering this approach), greening of research and innovation policies including sustainable development and climate change research at Federal level, the MIP2 (environment), GENERATIES and SMART GRID (energy) and FISCH (sustainable chemistry) platforms in Flanders; and the launch in Wallonia of a new ‘green’ competitiveness pole.

BOX 37 Belgian Presidency Priorities

For the first time Belgium is part of a Trio Presidency together with Spain and Hungary. In cooperation with these member states, Belgium developed a common Trio Presidency Programme which was approved by the European Council at the end of 2009 and which is implemented successively by the three Presidents in the 18 months from 1 January 2010.

Besides the priorities of the Trio Presidency, each presiding country also focuses on its own themes. The overall priority of the Belgian presidency will be the full development and consolidation of the European Research Area (ERA) through a close interaction between higher education, research and innovation policy. The aim being to promote Europe's competitiveness and greater convergence between national and regional policies and those pursued at the level of the Union.

R&D and innovation will be a key priority during the second half of 2010 in the Framework of the Europe 2020 strategy and through the flagship initiative 'Innovation Union' and will be the subject of in-depth discussions at the European Council meeting in October 2010. In line with the conclusions of the March 2010 European Council, the Competitiveness Council, through its research and industry strands, is expected to provide a contribution with a view to the European Council meeting. In particular, it will be

necessary to define the guidelines with a view to better coordination of Member States policies in order to reach the goal of spending 3% of GDP on R&D. The Belgian Presidency will focus on, amongst other issues, the development and implementation of a set of indicators to monitor progress towards full realisation of the ERA. The importance of the ERA for developing a sustainable economy and society will be emphasised.

With a view to the preparation of the 8th Research and Technological Development Framework Programme (FP8), the Council will continue during the Belgian Presidency work on the simplification of administrative procedures and financial controls begun under FP7.

The effective implementation of the free movement of knowledge in ERA (the fifth freedom) is vital. Under the Belgian Presidency, a particular focus will be placed on three initiatives to this end:

- Definition of the conditions for joint programming by the Member States through selection and implementation of a list of priority themes and the detailed arrangements for cooperation and for the coordination of joint research;
- Pursuit of the implementation of the European Partnership for Researchers;
- promote an enhanced integration of universities and research institutes in the knowledge triangle.

The Belgian Presidency will emphasise the importance of the regional dimension in the development, implementation and follow-up of innovation and research policies, in particular those where complementarities are possible with initiatives co-financed by the Structural Funds.

Through a number of strategic initiatives in the field of the bio-economy, low-carbon technologies development plan (in the framework of the Strategic Energy Technology plan) and marine and maritime research, the Council will examine during the Belgian Presidency the contribution of R&D to sustainable development.

The Trio Presidencies' aim will be to make concrete contributions as regards sustainable industrial policy initiatives, to promote eco-innovation and the development of a competitive green economy, in particular with a view to the Europe-2020 Strategy.

The extension of the current 7th EURATOM Framework Programme (from end 2001 to 2013 to coincide with the end of FP7) and on-going discussion on the ITER project will be key points on the agenda of the Council during the Belgian Presidency.

The Belgian Presidency will give particular attention the European space policy including EU-ESA co-operation, space exploration and space and security issues.

List of acronyms

- ♦ Name in English
 - ✦ Name in national language
 - Website (where applicable)
-
- 3B** ♦ Brussels Business Base Plug & Play Incubator
→ <http://www.incubateur3b.be/fr/index.html>
 - AAL** ♦ Ambient Assisted Living
→ <http://www.aal-europe.eu>
 - ABE** ♦ Brussels Enterprise Agency
✦ Agence Bruxelloise pour l'Entreprise
✦ Brussels Agentschap voor de Onderneming
→ <http://www.abe-bao.be>
 - ADS** ♦ Accelerator Driven System
 - AGORIA** ♦ Union of technology industries
✦ Federatie van de technologische industrie
✦ Fédération de l'industrie technologique
→ <http://www.agoria.be>
 - AO** ♦ Enterprise Flanders
✦ Agentschap Ondernemen
→ <http://www.agentschapondernemen.be>
 - ARC** ♦ Concerted Research Action
✦ Action de Recherche Concertée
 - ARKimedes** ♦ Activation of risk-bearing capital
✦ Activering Risicokapitaal
→ <http://www.pmvlaanderen.be/pmv/view/nl/kmo/producten/arkimedes/home>
 - ASE** ♦ Economic Stimulation Agency
✦ Agence de stimulation Economique
→ <http://www.as-e.be>
 - AST** ♦ Agency for Technology Promotion
✦ Agence de Stimulation Technologique
→ <http://ast.wallonie.be>
 - AWT** ♦ Walloon Telecommunication Agency
✦ Agence Wallonne des Télécommunications
→ <http://www.awt.be>
 - BAN Vlaanderen** ♦ Business Angels Network Flanders
✦ Business Angels Network Vlaanderen
→ <http://www.ban.be>
 - BAO** ♦ Brussels Enterprise Agency
✦ Agence Bruxelloise pour l'Entreprise
✦ Brussels Agentschap voor de Onderneming
→ <http://www.abe-bao.be>
 - BBRI** ♦ Belgian Building Research Institute
✦ Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf
✦ Centre Scientifique et Technique de la Construction
→ <http://www.bbri.be>
 - BB2B** ♦ Brains Back to Brussels
→ http://www.irsib.irisnet.be/bbtb_fr.htm
→ http://www.irsib.irisnet.be/bbtb_nl.htm
 - BCCM** ♦ Belgian Coordinated Collection of Micro-organisms
✦ Belgische Gecoördineerde Verzamelingen van Micro-organismen
✦ Collections coordonnées belges de microorganismes
→ <http://bccm.belspo.be>
 - BCRC** ♦ Belgian Ceramic Research Centre
→ <http://www.bcrc.be>
 - BEA** ♦ Brussels Enterprise Agency
✦ Agence Bruxelloise pour l'Entreprise
✦ Brussels Agentschap voor de Onderneming
→ <http://www.abe-bao.be>
 - BECI** ♦ Brussels Enterprises Commerce And Industry
✦ Chambre de Commerce et d'Industrie de Bruxelles
✦ Kamer voor Handel en Nijverheid van Brussel
→ <http://www.beci.be>
 - BELNET** ♦ Belgian national research network
✦ Belgisch nationaal onderzoekswetwerk
✦ Réseau national belge de la recherche
→ <http://www.belnet.be>
 - BELSPO** ♦ Belgian Federal Science Policy Office
✦ Federaal Wetenschapsbeleid
✦ Politique scientifique fédérale
→ <http://www.belspo.be>
 - BERD** ♦ Business expenditure on research and development
 - BIOWIN** ♦ Health Competitiveness Pole of Wallonia
✦ Pôle de compétitivité Santé de Wallonie
→ <http://www.biowin.org>
 - BLSI** ♦ Brussels Life Sciences Incubator
→ <http://www.parc.ucl.ac.be>
 - BNIX** ♦ Belgian National Internet Exchange
 - BOF** ♦ Special Research Fund
✦ Bijzonder Onderzoeksfonds
 - BPI** ♦ Belgian Packaging Institute
✦ Belgisch Verpakkingeninstituut
✦ Institut Belge de l'Emballage
→ <http://www.ibebvi.be>
 - BR2** ♦ Belgian Reactor 2
 - BRC** ♦ Biological Resource Centre
 - BRISTI** ♦ Belgian Report on Science, Technology and Innovation
 - BRRC** ♦ Belgian Road Research Centre
✦ Opzoekingscentrum voor de wegenbouw
✦ Centre de recherches routières
→ <http://www.brrc.be>
 - BRUFOTEC** ♦ Brussels food technology Association
→ brufotec@village.uu.net.be
 - BWI/BIL-IBS** ♦ Belgian Welding Institute
✦ Belgisch Instituut voor Lastechniek
✦ Institut Belge de la Soudure
→ <http://www.bil-ibs.be>
 - C2E-CET** ♦ Contract for Economy and Employment
✦ Contract Economie en Tewerstelling
✦ Contrat pour l'Economie et l'Emploi
 - C41STAR** ♦ Command, Control, Communications and Computers for Intelligence, Surveillance, Target Acquisition and Reconnaissance

- CAP2020** ♦ Cluster on Energy saving performances of buildings
→ <http://clusters.wallonie.be/cap-2020>
- CCIB** ♦ Brussels Enterprises Commerce And Industry
♦ Chambre de Commerce et d'Industrie de Bruxelles
♦ Kamer voor Handel en Nijverheid van Brussel
→ <http://www.beci.be>
- CEBEDEAU** ♦ Centre for Expertise in the Treatment and Management of Water
♦ Centre Belge d'étude et de Documentation de l'Eau
→ <http://www.cebedeau.be>
- CECAM** ♦ European centre for atomistic and molecular computations
♦ Centre Européen de Calcul Atomique et Moléculaire
→ <http://www.cecam.org>
- CEI** ♦ de Interministeriële Economische Commissie
♦ Commission Economique Interministérielle
- CELABOR** ♦ Research and Control Centre on Wood and Chemicals
♦ Centre de Recherche et de Contrôle Lainier et Chimique
→ <http://www.celabor.be>
- CENAERO** ♦ Centre of Excellence in Aeronautical Research
♦ Centre d'Excellence en Recherche aéronautique
→ <http://www.cenaero.be>
- CENTEXBEL** ♦ Belgian Textile Research Centre
♦ Technisch en Wetenschappelijk Centrum voor de Belgische Textielnijverheid
♦ Centre Scientifique et Technique de l'Industrie Belge du Textile
→ <http://www.centexbel.be>
- CER** ♦ Rural Economy Centre
♦ Centre d'Economie Rurale
→ <http://www.cergroupe.be>
- CeRDT** ♦ Centre for R&D promotion and technology exploitation in Hainaut
♦ Centre de Promotion de la Recherche et Développement et de Valorisation des Technologies en Hainaut
→ <http://www.cerdt.be>
- CERN** ♦ European Organisation for Nuclear Research
→ <http://public.web.cern.ch>
- CERT.be** ♦ Belgian Computer Emergency Response Team
- CERTECH** ♦ Centre of Technological Resources in Chemistry
♦ Centre de Ressources Technologiques en Chimie
→ <http://www.certech.be>
- CESRW** ♦ Walloon Economic and Social Council
♦ Conseil économique et social de la Région wallonne
→ <http://www.cesrw.be>
- CETIC** ♦ Centre of Excellence in Information and Communication Technologies
♦ Centre d'Excellence en Technologie de l'Information et de la Communication
→ <http://www.cetic.be>
- CEWAC** ♦ Walloon research centre on assembling and material testing
♦ Centre wallon d'études de l'assemblage et du contrôle des matériaux
→ <http://www.cewac.be>
- CFS** ♦ Federal Co-operation Commission
♦ Commissie Federale Samenwerking
♦ Commission Coopération Fédérale
- CFS/STAT** ♦ Federal Cooperation Commission on statistics
- CIMPS-IMCWB** ♦ Inter-Ministerial Conference on Science Policy
♦ Interministeriële Conferentie Wetenschapsbeleid
♦ Conférence interministérielle de la Politique scientifique
- CIP** ♦ Competitiveness and Innovation Programme
→ <http://ec.europa.eu/cip>
- CIPS-ICWB** ♦ Federal Inter-ministerial Commission for Scientific Policy
- CIS** ♦ International Co-operation Commission
♦ Commissie Internationale Samenwerking
♦ Commission Coopération internationale
- CIS** ♦ Community Innovation Survey
- CIUF** ♦ Inter-university Council of the French Community
♦ Conseil Interuniversitaire de la Communauté Française
→ <http://www.ciuf.be>
- CIV** ♦ Cleantech Investment Vehicle
- CLARIN** ♦ Common Language Resources and Technology Infrastructure
- CLUSTA** ♦ Flemish network for the steel plating industry
♦ Vlaamse netwerkorganisatie voor de staalplaatverwerkende industrie
→ <http://www.clusta.be>
- CMI** ♦ Centre for Medical Innovation
♦ Centrum voor Medische Innovatie
- CMOS** ♦ Complementary metal-oxide-semiconductor
- CNRS** ♦ French National Centre for Scientific Research
♦ Centre national de la recherche scientifique or CNRS
→ <http://www.cnrs.fr>
- COHESI** ♦ Flemish innovation platform for component development and complex heterogeneous systems integration
- CORI** ♦ Coatings Research Institute
♦ Institut de Recherche des Revêtements, Peintures et Encres
→ <http://www.cori-coatings.be>
- COST** ♦ European Cooperation in the Field of Scientific and Technical Research
→ <http://www.cost.eu>
- CPS^{86c}** ♦ Science Policy Council of the Brussels-Capital Region
♦ Conseil de la politique scientifique de la Région de Bruxelles-Capitale
♦ Raad voor het Wetenschapsbeleid van het Brussels Hoofdstedelijk Gewest
→ http://www.irsib.irisnet.be/CPS/cps_index_fr.htm
→ http://www.irsib.irisnet.be/CPS/cps_index_nl.htm
- CRAW** ♦ Walloon Centre for Agricultural Research
♦ Centre Wallon de Recherches Agronomiques
→ <http://cra.wallonie.be>
- CRC** ♦ Clinical Research Centre
- CRef** ♦ Council of Rectors of the French Speaking Community
♦ Conseil des Recteurs de la Communauté Française
→ <http://www.cref.be>
→ <http://www.consilium.europa.eu/showPage.aspx?id=1422&lang=en>

- CRIC-OCNC** ♦ Belgian Center for scientific and technical researches for the cement industry
 ♦ Nationale Centrum van Wetenschappelijk en Technisch Onderzoek voor de cementnijverheid
 ♦ Centre national de Recherches Scientifiques et techniques pour l'industrie cimentière
 → <http://www.cric.be>
- CRM** ♦ Centre for Research in Metallurgy
 ♦ Centre de Recherches Métallurgiques
 → <http://www.crm-eur.com>
- CSDS** ♦ Centre for Security and Defence Studies
- CSL** ♦ Liège Space Centre
 ♦ Centre Spatial de Liège
 → <http://www.csl.ulg.ac.be>
- CSTC** ♦ Belgian Building Research Institute
 ♦ Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf
 ♦ Centre Scientifique et Technique de la Construction
 → <http://www.cstc.be>
- CSTP** ♦ Committee on Science and Technological Innovation Policy
- CTIB-TCHN** ♦ Belgian Institute for Wood Technology
 ♦ Technisch Centrum van de Houtnijverheid
 ♦ Centre Technique de l'Industrie du Bois
 → <http://www.ctib-tchn.be>
- CTP** ♦ International technology centre for earth and stone
 ♦ Centre Technologique International de la Terre et de la Pierre
 → <http://www.ctp.be>
- CTU** ♦ Clinical Trial Unit
- CV** ♦ Curriculum Vitae
- CWPS** ♦ Walloon Science Policy Council
 ♦ Conseil Wallon de la Politique Scientifique
 → <http://www.cesrw.be/index.php?page=detail&alias=Conseil-de-la-Politique-scientifique-CPS>
- DG** ♦ Directorate-General
- DGDC** ♦ Federal Directorate-General for Development Cooperation
- DGENORS** ♦ Directorate-General for non-obligatory education and scientific research of the French Community
 ♦ Direction générale de l'Enseignement non obligatoire et de la recherche scientifique
 → <http://www.enseignement.be>
- DGO** ♦ Operational Directorate-General
- DGO6** ♦ DG for Economy, Employment and Research of the Walloon Public Service
 ♦ Direction générale opérationnelle de l'Économie, de l'Emploi et de la Recherche
 → <http://recherche-technologie.wallonie.be>
- DIE-OPRI** ♦ Federal Service for Intellectual Property
 ♦ Dienst voor de intellectuele Eigendom
 ♦ Office belge de la Propriété intellectuelle
 → <http://economie.fgov.be/opri-die.jsp>
- DLD** ♦ Defence Laboratories
- DSP Valley** ♦ Digital signal processing Valley
 → <http://www.dspvalley.com>
- DUBBLE** ♦ Dutch-Belgian beamline
 → <http://www.esrf.eu/UsersAndScience/Experiments/CRG/BM26>
- DYMASEC** ♦ DYnamic MAterials for SECurity
- ECMWF** ♦ European Centre for Medium-Range Weather Forecasts
 → <http://www.ecmwf.int>
- ECOBUILD** ♦ Eco-building cluster in Brussels
 → <http://www.ClusterEcobuild.be>
- ECT** ♦ European Centre for Theoretical Studies in Nuclear Physics and Related Areas
 → <http://www.ect.it>
- EDA** ♦ European Defence Agency
 → <http://www.eda.europa.eu>
- EDA** ♦ Electronic design automation
- EDCTP** ♦ European and developing countries clinical trials partnership
 → <http://www.edctp.org>
- EEBIC** ♦ Erasmus European Business and Innovation Centre
 → <http://www.eebic.be>
- EEN** ♦ Enterprise Europe Network
 → http://www.enterprise-europe-network.ec.europa.eu/index_en.htm
- EEN Vlaanderen** ♦ Enterprise Europe Vlaanderen
 → <http://www.enterpriseeuropelaanderen.be>
- EFDA** ♦ European Fusion Development Agreement
 → <http://www.efda.org>
- EIROforum** ♦ European Intergovernmental Research Organisations Forum
 → <http://www.eiroforum.org>
- EIS** ♦ European Innovation Scoreboard
 → <http://www.proinno-europe.eu/metrics>
- EIT** ♦ European Institute of Innovation and Technology
 → <http://eit.europa.eu>
- ELAt** ♦ Eindhoven-Leuven-Aachen triangle
 → <http://www.elat.org>
- EMBC** ♦ Erasmus Mundus Master of Science in Marine Biodiversity and Conservation
 → <http://embc.marbef.org>
- EMBL** ♦ European Molecular Biology Laboratory
 → <http://www.embl.de>
- EP** ♦ European Parliament
 → <http://www.europarl.europa.eu>
- EPG** ♦ Enterprise Policy Group
 → http://ec.europa.eu/enterprise/dg/epg/index_en.htm
- EPO** ♦ European Patent Office
 → <http://www.epo.org>
- ERA** ♦ European Research Area
 → <http://ec.europa.eu/research/era>
- ERAC** ♦ European Research Area Committee
 ♦ Comité de la recherche scientifique et technique
- ERCIM** ♦ European Research Consortium for Informatics and Mathematics
 → <http://www.ercim.eu>
- ERDF** ♦ European Regional Development Fund
 → http://ec.europa.eu/regional_policy/funds/feder/index_en.htm
- ERRIN** ♦ European Regions research and Innovation Network
 → <http://www.errin.eu>
- ESA** ♦ European Space Agency
 → <http://www.esa.int>
- ESF** ♦ European Science Foundation
 → <http://www.esf.org>
- ESFRI** ♦ European Strategy Forum on Research Infrastructures
 → http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri
- ESO** ♦ European Southern Observatory
 → <http://www.eso.org>
- ESRF** ♦ European Synchrotron Radiation Facility
 → <http://www.esrf.eu>

- ESS** ♦ European Social Survey
→ <http://www.europeansocialsurvey.org>
- EU** ♦ European Union
→ <http://europa.eu>
- EUMETSAT** ♦ European Organisation for the Exploitation of Meteorological Satellites
→ <http://www.eumetsat.int>
- EUPRO** ♦ European Union of Physics Research Organisations
→ <http://www.eupro.cbpc.ens-lyon.fr>
- EURATOM** ♦ European Atomic Energy Community
→ <http://www.euratom.org>
- EUREKA** → <http://www.eurekanetwork.org>
- Eurobiotec** ♦ Technology Center for Biotech Innovations
→ <http://www.eurobiotec.be>
- EUROHORCS** ♦ European Heads of Research Councils
→ <http://www.eurohorcs.org>
- EUROSTAT** ♦ Statistical office of the European Union
→ <http://ec.europa.eu/eurostat>
- EWI** ♦ Department of Economy, Science and Innovation of the Flemish Government
✦ Departement Economie, Wetenschap en Innovatie van de Vlaamse overheid
→ <http://www.ewi-vlaanderen.be>
- FCSP** ♦ Federal Council for Science Policy
✦ Federale Raad voor Wetenschapsbeleid
✦ Conseil fédéral de la Politique scientifique
- FEDICT** ♦ Federal Public Service for Information and Communication Technologies
✦ Federale Overheidsdienst Informatie- en Communicatietechnologie
✦ Service Public Fédéral Technologie de l'Information et de la Communication
→ <http://www.fedict.belgium.be>
- FedMAN** ♦ Federal Metropolitan Area Network
- FGV (→ VIGC)** ♦ Flanders Graphic Valley
- FIRST** ♦ Training and Promotion of Scientific and Technological Research
✦ Formation et Impulsion à la Recherche Scientifique et Technologique
- FISCH** ♦ Flanders strategic Initiative for Sustainable Chemistry
→ <http://www.fisch-essencia.be>
- FLAMAC** ♦ Flanders Materials Centre
→ <http://www.flamac.be>
- FLANDERS DC** → <http://www.flandersdc.be>
- Flanders' DRIVE** → <http://www.flandersdrive.be>
- Flanders Food** → <http://www.flandersfood.com>
- Flanders InShape** → <http://www.flandersinshape.be>
- Flanders' Synergy** → <http://flanderssynergy.be>
- Flanders' Plasticvision** → <http://www.plasticvision.be>
- FMTc** ♦ Flanders' Mechatronics Technology Centre
→ <http://www.fmtc.be>
- FOL** ♦ Federal Orientation Laboratory
- FP** ♦ Framework Programme for Research and Technological Development
- FP6** ♦ Sixth Framework Programme for Research and Technological Development
- FP7** ♦ Seventh Framework Programme for Research and Technological Development
- FPS** ♦ Federal Public Service
- FRFC** ♦ Fund for basic collective research at the initiative of researchers
✦ Fonds de la recherche fondamentale collective à l'initiative des chercheurs
- FRIA** ♦ Fund for research and education within industry and agriculture
✦ Fonds pour la formation à la Recherche dans l'Industrie et dans l'Agriculture
- FRS-FNRS** ♦ Scientific Research Fund
✦ Fonds de la Recherche Scientifique – FNRS
→ <http://www2.frs-fnrs.be>
- FRSM** ♦ Fund for Medical Scientific Research
✦ Fonds de la recherche scientifique médicale
- FSR** ♦ Special Research Fund
✦ Fonds Spécial pour la Recherche
- FTE** ♦ Full Time Equivalent
- FUCAM** ♦ Catholic University of Mons
✦ Facultés Universitaires Catholiques de Mons
→ <http://www.fucam.ac.be>
- FUNDP** ♦ University of Namur
✦ Facultés Universitaires Notre-Dame de la Paix
→ <http://www.fundp.ac.be>
- FUST** ♦ Flanders' UNESCO Science Trust Fund
→ <http://www.unesco-vlaanderen.be>
- FWO** ♦ Research Foundation Flanders
✦ Fonds voor Wetenschappelijk Onderzoek Vlaanderen
→ <http://www.fwo.be>
- GBAORD** ♦ Government Budgetary Appropriations on R&D
- GDP** ♦ Gross Domestic Product
- GERD** ♦ Gross expenditure on R&D
- GIMB** ♦ Brussels Regional Investment Company
✦ Société Régionale d'Investissement de Bruxelles
✦ Gewestelijke Investeringsmaatschappij voor Brussel
→ <http://www.srib.be>
- GIMV** ♦ Flanders Investment Company
→ <http://www.gimv.com>
- GMO** ♦ Genetically Modified Organisms
- GOMB** ♦ Brussels Regional Development Agency
✦ Société de Développement pour la Région de Bruxelles-Capitale Gewestelijke Ontwikkelingsmaatschappij voor het Brussels Hoofdstedelijk Gewest
→ <http://www.sdrb.irisnet.be>
- GPC** ♦ High Level Group for Joint Programming
✦ Groupe de haut niveau pour la Programmation Conjointe
- GPI** ♦ Regional Plan for Innovation
✦ Plan Régional pour l'Innovation
✦ Gewestelijk Plan voor Innovatie
- GPS** ♦ Global Monitoring System
- HCB-KA** ♦ Central Hospital Base Queen Astrid
- HEI** ♦ Higher education institution
- HERD** ♦ Higher Education expenditure on Research and Development
- HR** ♦ Human resources
- HUB-KUBrussel** → <http://www.hubrussel.be>
- IA** ♦ Innovative Public Procurement
✦ Innovatief Aanbesteden
→ <http://www.iwt.be/diensten/innovatief-aanbesteden-ia>
- IBBT** ♦ Interdisciplinary Institute for Broadband Technology
✦ Interdisciplinair Instituut voor Breedband Technologie
→ <http://www.ibbt.be>
- ICAB** ♦ Incubator Arsenal Brussels
✦ Incubatiecentrum Arsenal Brussel
→ <http://www.icabrussel.be>
- ICOS** ♦ Integrated Carbon Observation System
- ICR** ♦ Interdisciplinary Cooperative Research
- ICT** ♦ Information and communication technologies
- IEC** ♦ Inter-ministerial Economic Commission
✦ Interministeriële Economische Commissie

- IFMIF** ♦ International Fusion Materials Irradiation Facility
→ <http://www.frascati.enea.it/ifmif>
- IISN** ♦ Interuniversity Institute of Nuclear Sciences
♦ Institut interuniversitaire des sciences nucléaires
- ILL** ♦ Laue-Langevin Institute
♦ Institut Laue-Langevin
→ <http://www.ill.eu>
- ILVO** ♦ Institute for Agricultural and Fisheries Research
♦ Instituut voor Landbouw en Visserijonderzoek
→ <http://www.ilvo.vlaanderen.be>
- IMEC** ♦ Interuniversity Microelectronics Centre
♦ Interuniversitair Micro-Elektronica Centrum
→ <http://www2.imec.be>
- IMI** ♦ Innovative Medicines Initiative
→ <http://imi.europa.eu>
- INBO** ♦ Research Institute for Nature and Forest
♦ Instituut voor Natuur- en Bosonderzoek
→ <http://www.inbo.be>
- INISMA** ♦ Interuniversity research Institute on silicates, soils and materials
♦ Institut Interuniversitaire des Silicates, Sols et Matériaux
→ <http://www.bcrc.be>
- IOC** ♦ Intergovernmental Oceanographic Commission
→ <http://ioc-unesco.org>
- IODE** ♦ International Oceanographic Data and Information Exchange
→ <http://www.iode.org>
- IOF** ♦ Industrial Development Fund
♦ Industrieel Onderzoeksfonds
- IPH/ISP-WIV** ♦ Scientific Institute for Public Health
♦ Belgisch Wetenschappelijk Instituut
♦ Institut scientifique de Santé Publique belge
→ <http://www.iph.fgov.be>
- IPR** ♦ Intellectual property rights
- IRSIB** ♦ Institute for the encouragement of Scientific Research and Innovation of Brussels
♦ Institut d'encouragement de la Recherche Scientifique et de l'Innovation de Bruxelles
♦ Instituut ter bevordering van het Wetenschappelijk Onderzoek en de Innovatie van Brussel
→ <http://www.irsib.irisnet.be>
→ <http://www.iwoib.irisnet.be>
- ISBR** ♦ Interdisciplinary strategic basic research
- ISIB** ♦ Brussels Engineering Institute
♦ Institut supérieur Industriel de Bruxelles
→ <http://www.isib.be>
- ISP** ♦ Internet Service Provider
- ISRIB** ♦ Institute for the encouragement of Scientific Research and Innovation of Brussels
♦ Institut d'encouragement de la Recherche Scientifique et de l'Innovation de Bruxelles
♦ Instituut ter bevordering van het Wetenschappelijk Onderzoek en de Innovatie van Brussel
→ <http://www.irsib.irisnet.be>
→ <http://www.iwoib.irisnet.be>
- ISSEP** ♦ Scientific Institute for Public Services
♦ Institut Scientifique de Service Public
→ <http://www.issep.be>
- IST** ♦ Institute Society and Technology
♦ Instituut Samenleving en Technologie
→ <http://www.samenlevingentechnologie.be>
- IT** ♦ Information Technologies
- ITER** ♦ International Thermonuclear Experimental Reactor
- ITM** ♦ Institute for Tropical Medicine
♦ Instituut voor Tropische Geneeskunde
→ <http://www.itg.be>
- IUAP** ♦ Inter-University Attraction Poles
♦ Interuniversitaire attractiepolen
♦ Pôles d'attraction interuniversitaires
→ http://www.belspo.be/belspo/iap/index_en.stm
- IWOIB** ♦ Institute for the encouragement of Scientific Research and Innovation of Brussels
♦ Institut d'encouragement de la Recherche Scientifique et de l'Innovation de Bruxelles
♦ Instituut ter bevordering van het Wetenschappelijk Onderzoek en de Innovatie van Brussel
→ <http://www.irsib.irisnet.be>
→ <http://www.iwoib.irisnet.be>
- IWT** ♦ Agency for innovation by Science and Technology
♦ Agentschap voor Innovatie door Wetenschap en Technologie
→ <http://www.iwt.be>
- JRC** ♦ Joint Research Centre
→ <http://www.jrc.ec.europa.eu>
- JTI** ♦ Joint Technology Initiative
→ <http://cordis.europa.eu/fp7/jtis>
- KAGB** ♦ Royal Academy for Medicine of Belgium
♦ Koninklijke Academie voor Geneeskunde van België
→ <http://www.academiegeneeskunde.be>
- KANTL** ♦ Royal Academy for Dutch Language and Literature
♦ Koninklijke Academie voor Nederlands Taal- en letterkunde
→ <http://www.kantl.be>
- KHBN** ♦ Brussels Enterprises Commerce And Industry
♦ Chambre de Commerce et d'Industrie de Bruxelles
♦ Kamer voor Handel en Nijverheid van Brussel
→ <http://www.beci.be>
- KIC** ♦ Knowledge and Innovation Communities
- KMSKA** ♦ Royal Museum of Fine Arts Antwerp
♦ Koninklijk Museum voor Schone Kunsten Antwerpen
→ <http://www.kmska.be>
- K.U.Leuven** ♦ Catholic University of Leuven
♦ Katholieke Universiteit Leuven
→ <http://www.kuleuven.be>
- KVAB** ♦ Royal Flemish Academy of Belgium for Sciences and Arts
♦ Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten
→ <http://www.kvab.be>
- LIEU** ♦ Enterprise University network
♦ Liaison Entreprises-Universités
→ <http://www.reseau lieu.be>
- LO** ♦ Agriculture Research Programme
♦ Programma Landbouwkundig Onderzoek
→ <http://www.iwt.be/subsidies/landbouwonderzoek>
- LPP/ERM-KMS** ♦ Plasmas Physics Laboratory
→ <http://fusion.rma.ac.be>
- MATERIA NOVA** ♦ Centre of excellence on materials
♦ Centre d'excellence dédié aux matériaux
→ <http://www.materia-nova.com>

- MBCR** ♦ Ministry of the Brussels-Capital Region
 ✦ Ministère de la Région de Bruxelles-Capitale
 ✦ Ministerie van het Brussels Hoofdstedelijk Gewest
- MBHG** ♦ Ministry of the Brussels-Capital Region
 ✦ Ministère de la Région de Bruxelles-Capitale
 ✦ Ministerie van het Brussels Hoofdstedelijk Gewest
- MECATECH** ♦ Competitiveness Pole in Mechanical Engineering
 ✦ Pôle de compétitivité wallon en génie mécanique
 → <http://www.polemecatech.be>
- MET** ♦ Ministry of Equipment and Transport
 ✦ Ministère de l'équipement et du transport
- MIP2** ♦ Environment and energy technology innovation platform
 ✦ Milieu- en energietechnologie Innovatie Platform 2
 → <http://www.mipvlaanderen.be>
- MIRAS** ♦ Microwave Imaging Radiometer using Aperture Synthesis
 → <http://www.esa.int/esaLP/Lpsmos.html>
- MITECH** ♦ Cluster on Micro-Technologies for Intelligent Manufacturing & Products
 → <http://clusters.wallonie.be/mitech>
- MOBINISS** ♦ Mobile Intelligence Information Sensors for Security
- MoD** ♦ Ministry of Defence
 ✦ Ministerie van Defensie
 ✦ Ministère de la Défense
 → <http://www.mil.be>
- MRA** ♦ Royal Museum of the armed forces and of military history
 ✦ Koninklijk Museum van het Leger en de Krijgsgeschiedenis
 ✦ Musée Royal de l'Armée et de l'Histoire Militaire
 → <http://www.klm-mra.be>
- MRBC** ♦ Ministry of the Brussels-Capital Region
 ✦ Ministère de la Région de Bruxelles-Capitale
 ✦ Ministerie van het Brussels Hoofdstedelijk Gewest
- MRW** ♦ Ministry of the Walloon Region
- MULTITEL** ♦ Research Centre in Telecommunications, Signal and Image Processing
 ✦ Centre de Recherche en Télécommunications, Traitement du Signal et de l'Image
 → <http://www.multitel.be>
- MYRRHA** ♦ Multi-purpose hybrid research reactor for high-tech applications
 → <http://myrrha.sckcen.be>
- NATO** ♦ North Atlantic Treaty Organisation
 → <http://www.nato.int>
- NCP** ♦ National Contact Point
- NEREUS** ♦ Network of European Regions Using Space Technologies
 → <http://www.nereus-regions.eu>
- NERF** ♦ Neuro-Electronics Research Flanders
 → <http://www.nerf.be>
- NESTI** ♦ National Experts on Science and Technology Indicators
- NGI** ♦ National Geographic Institute
 ✦ Nationaal Geografisch Instituut
 ✦ Institut géographique national
 → <http://www.ngi.be>
- OBIS** ♦ Ocean Biogeographic Information System
 → <http://www.iobis.org>
- OECD** ♦ Organisation for Economic Co-operation and Development
 → <http://www.oecd.org>
- OMC** ♦ Open Method of Coordination
- OVAM** ♦ Public Waste Agency of Flanders
 ✦ Openbare Vlaamse Afvalstoffenmaatschappij
 → <http://www.ovam.be>
- OZM** ♦ Post-doctoral Research Fellowship
 ✦ Onderzoeksmandaten
 → <http://www.iwt.be/subsidies/onderzoeksmandaten>
- PASS** ♦ Scientific Adventures Parc
 ✦ Parc d'aventures scientifiques
 → <http://www.pass.be>
- PATLIB** ♦ Patent information centres
 ✦ PATent LIBrary
 → <http://www.epo.org/patents/patent-information/patlib/directory/belgium.html>
- PIM** ♦ Innovative Media Programme
 ✦ Programma Innovatieve Media
 → <http://www.iwt.be/nieuws/programma-innovatieve-media-pim>
- PIT** ♦ Technological Innovation Partnership
 ✦ Partenariat d'innovation technologique
- PLASTIWIN** ♦ Cluster on moulders, plastic parts, and raw material
 → <http://clusters.wallonie.be/plastiwin>
- PMV** ♦ Flanders Holding Company
 ✦ Participatiemaatschappij Vlaanderen
 → <http://www.pmv.eu>
- PPP** ♦ Public Private Partnership
- PRFB** ♦ Prospective Research for Brussels
- PRI** ♦ Regional Plan for Innovation
 ✦ Plan Régional pour l'Innovation
 ✦ Gewestelijk Plan voor Innovatie
- PRINS** ♦ Pan-European Research Infrastructure for Nano-Structures
- PRO** ♦ Public Research Organisation
- PRODEX** ♦ PROgramme for the Development of scientific Experiments
 ✦ PROgramme de Développement d'Experiences scientifiques
 → <http://sci.esa.int/science-e/www/area/index.cfm?fareaid=76>
- PWO** ♦ Project-based Scientific Research
 ✦ Projectmatig Wetenschappelijk Onderzoek
- R&D** ♦ Research and Development
- RHID** ♦ Royal High Institute for Defence
 ✦ Koninklijk Hoger Instituut voor Defensie
 ✦ Institut Royal Supérieur de Défense
 → <http://www.mil.be/rdc>
- RIB** ♦ Research in Brussels
 → <http://www.rib.irisnet.be>
- RIVM** ♦ Dutch National Institute for Public Health and the Environment
 ✦ Rijksinstituut voor Volksgezondheid en Milieu
 → <http://www.rivm.nl>
- RPR** ♦ Research Project Manager
 ✦ Responsable de projet de recherche
- RTD** ♦ Research and Technological Development
 ✦ Onderzoek en Technologische Ontwikkeling
- RWB^{BHG}** ♦ Science Policy Council of the Brussels-Capital Region
 ✦ Conseil de la politique scientifique de la Région de Bruxelles-Capitale
 ✦ Raad voor het Wetenschapsbeleid van het Brussels Hoofdstedelijk Gewest
 → http://www.irsib.irisnet.be/CPS/cps_index_fr.htm

- http://www.irsib.irisnet.be/CPS/cps_index_nl.htm
- SB** ♦ Post-graduate strategic research Grants
 ✦ Strategische onderzoeksbeurzen
 → <http://www.iwt.be/subsidies/sb>
- SBO** ♦ Strategic Basic Research
 ✦ Strategisch BasisOnderzoek
 → <http://www.iwt.be/subsidies/sbo>
- SCK-CEN** ♦ Belgian Nuclear Research Centre
 ✦ Studiecentrum voor Kernenergie
 ✦ Centre d'Etude de l'Energie Nucléaire
 → <http://www.sckcen.be>
- SDRB** ♦ Brussels Regional Development Agency
 ✦ Société de Développement pour la Région de Bruxelles-Capitale
 ✦ Gewestelijke Ontwikkelings-maatschappij voor het Brussels Hoofdstedelijk Gewest
 → <http://www.sdrb.irisnet.be>
- SecEU** ♦ European Security
- SERV** ♦ Flanders Social and Economic Council
 ✦ Sociaal-Economische Raad van Vlaanderen
 → <http://www.serv.be>
- SHARE** ♦ Survey of Health, Ageing and Retirement in Europe
- SIC** ♦ Signal, Systems & Sensors, Information & Intelligence, Communication
- SIF** ♦ Systems-in-Foil
- SIM** ♦ Strategic Initiative Materials
 ✦ Strategisch Initiatief Materialen in Vlaanderen
 → <http://www.sim-flanders.be>
- SIRRIS** ♦ Collective Centre of the Belgian Technology Industry
 ✦ Collectief Centrum van de Belgische Technologische Industrie
 ✦ Centre Collectif de l'Industrie Technologique
 → <http://www.sirris.be>
- SKYWIN** ♦ Aerospace competitiveness pole
 ✦ Pôle de compétitivité du secteur aéronautique et spatial
 → <http://www.skywin.be>
- SME** ♦ Small and medium-sized enterprises
- SOC** ♦ Strategic Research Centre
 ✦ Strategische Onderzoekscentra
- SOWALFIN** ♦ Walloon SME Financing Agency
 ✦ Société Wallonne de Financement et de Garantie des Petites et Moyennes Entreprises
 → <http://www.sowalfin.be>
- SPC^{BCR}** ♦ Science Policy Council of the Brussels-Capital Region
 ✦ Conseil de la politique scientifique de la Région de Bruxelles-Capitale
 ✦ Raad voor het Wetenschapsbeleid van het Brussels Hoofdstedelijk Gewest
 → http://www.irsib.irisnet.be/CPS/cps_index_fr.htm
 → http://www.irsib.irisnet.be/CPS/cps_index_nl.htm
- SPICAM** ♦ Spectroscopy for Investigation of Characteristics of the Atmosphere of Mars
- SPOT** ♦ Earth observation satellite system
 ✦ Satellite Pour l'Observation de la Terre
- SPoW** ♦ Science Parks of Wallonia
 → <http://www.spow.be>
- SPSD** ♦ Scientific Support Plan for a Sustainable Development Policy
 ✦ Plan voor wetenschappelijke Ondersteuning van een beleid gericht op Duurzame Ontwikkeling
- ✦ Plan d'appui scientifique à une politique de développement durable
 → <http://www.belspo.be/ssd>
- STRIB** ♦ Brussels Regional Investment Company
 ✦ Société Régionale d'Investissement de Bruxelles
 ✦ Gewestelijke Investeringsmaatschappij voor Brussel
 → <http://www.srib.be>
- STEVIN** ♦ Essential Speech and Language Technology Resources for Dutch
 ✦ Spraak- en Taaltechnologische Essentiële Voorzieningen In het Nederlands
 → <http://stevin-tst.org>
- STI** ♦ Science, Technology and Innovation
- STIS/SIST-DWTI** ♦ Scientific and Technical Information Service
 ✦ Dienst Voor Wetenschappelijke En Technische Informatie
 ✦ Service d'Information Scientifique et Technique
 → <http://www.stis.fgov.be>
- STRD** ♦ Science and Technology Research of Defence
- STV** ♦ Flemish Foundation for Technology Assessment – Innovation & Works
 ✦ Stichting Technologie Vlaanderen – Innovatie & Werk
 → <http://www.serv.be>
- SWOT** ♦ Strengths, Weaknesses, Opportunities, and Threats
- TAFTIE** ♦ The Association for Technology Implementation in Europe
 → <http://www.taftie.org>
- TBM** ♦ Applied Biomedical Research
 ✦ Toegepast Biomedisch Onderzoek
 → <http://www.iwt.be/subsidies/tbm>
- TD** ♦ Technological advice
 ✦ Technologische Dienstverlening
 → <http://www.iwt.be/subsidies/vis-td>
- TETRA Fund** ♦ Technology Transfer Fund
 ✦ Technologietransfer door instellingen van hoger onderwijs
 → <http://www.iwt.be/subsidies/tetra>
- TIP** ♦ Technology and Innovation Policy
- TIS** ♦ Thematic Innovation Stimulation
 ✦ Thematische InnovatieStimulering
 → <http://www.iwt.be/subsidies/vis-tis>
- TNO** ♦ Netherlands Organisation for Applied Scientific Research
 ✦ Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek
 → <http://www.tno.nl>
- TWEED** ♦ Cluster of Energy, Environment and Sustainable Development technologies
 ✦ Cluster Technologie Wallonne Energie – Environnement et Développement durable
 → <http://clusters.wallonie.be/tweed>
- TWIST** ♦ Cluster on Walloon Technologies for Image, Sound and Text
 ✦ Cluster Technologies Wallonnes de l'Image, du Son et du texte
 → <http://clusters.wallonie.be/twist>
- UA** ♦ University of Antwerp
 ✦ Universiteit Antwerpen
 → <http://www.ua.ac.be>
- UAMS** ♦ University of Antwerp Management School
 ✦ Universiteit Antwerpen Management School
 → <http://www.uams.be/EN>

- UA** ♦ University of Antwerp
 ♦ Universiteit Antwerpen
 → <http://www.ua.ac.be>
- UCL** ♦ Catholic University of Louvain
 ♦ Université Catholique de Louvain
 → <http://www.uclouvain.be>
- UGent** ♦ Ghent University
 ♦ Universiteit Gent
 → <http://www.ugent.be>
- UHasselt** ♦ University of Hasselt
 ♦ Universiteit Hasselt
 → <http://www.uhasselt.be>
- ULB** ♦ Free University of Brussels
 ♦ Université Libre de Bruxelles
 → <http://www.ulb.ac.be>
- ULG** ♦ University of Liège
 ♦ Université de Liège
 → <http://www.ulg.ac.be>
- UN** ♦ United Nations
 → <http://www.un.org>
- UNESCO** ♦ United Nations Educational, Scientific and Cultural Organisation
 → <http://www.unesco.org>
- UNIDO** ♦ United Nations Industrial Development Organisation
 → <http://www.unido.org>
- USPTO** ♦ United States Patent and Trademark Office
 → <http://www.uspto.gov>
- UWE** ♦ Walloon Business Federation
 ♦ Union Wallonne des Entreprises
 → <http://www.uwe.be>
- UZ Antwerpen** ♦ Antwerp University Hospital
 ♦ Universitair Ziekenhuis Antwerpen
 → <http://www.uza.be>
- UZ Brussel** ♦ Universitair Ziekenhuis Brussel
 → <http://www.uzbrussel.be>
- UZ Gent** ♦ Ghent University Hospital
 ♦ Universitair Ziekenhuis Gent
 → <http://www.uzgent.be>
- UZ Leuven** ♦ University Hospitals Leuven
 → <http://www.uzleuven.be>
- VEA** ♦ Flemish Energy Agency
 ♦ Vlaams Energieagentschap
 → <http://www.energiesparen.be>
- VEI** ♦ Flemish Electro Innovation Centre
 ♦ Vlaams Elektro Innovatiecentrum
 → <http://www.vei.be>
- ViA** ♦ Flanders in Action
 ♦ Vlaanderen in Actie
 → <http://www.vlaandereninactie.be> or
 → <http://www.flandersinaction.be>
- VIB** ♦ Flanders' Institute for Biotechnology
 ♦ Vlaams Instituut voor Biotechnologie
 → <http://www.vib.be>
- VIGC** ♦ Flemish Innovation Center for Graphic Communication
 ♦ Vlaams Innovatiecentrum voor Grafische Communicatie
 → <http://vigc.be>
- VIL** ♦ Flanders Institute for Logistics
 ♦ Vlaams Instituut voor de Logistiek
 → <http://www.vil.be>
- VIM** ♦ Flanders Institute for Mobility
 ♦ Vlaams Instituut voor de Mobiliteit
 → <http://www.vim.be>
- VIN** ♦ Flemish Innovation Network
 ♦ Vlaams Innovatienetwerk
 → <http://www.innovatienetwerk.be>
- VINNOF** ♦ Flemish Innovation Fund
 ♦ Vlaams Innovatiefonds
 → <http://www.pmv.eu/pmv/view/en/sme/products/vinnof>
- VIOE** ♦ Flemish Institute for Archaeological Heritage
 ♦ Vlaams Instituut voor Onroerend Erfgoed
 → <http://www.vioe.be>
- VIS** ♦ Flemish Co-operative Innovation Networks
 ♦ Vlaamse Innovatiesamenwerkingsverbanden
 → http://www.iwt.be/subsidies?tid=All&tid_1=28&tid_2=All
- VIS-CO** ♦ VIS Collective Research Programme
 ♦ Vis – Collectief Onderzoek Programma
 → <http://www.iwt.be/subsidies/vis-co>
- VIS-RIS** ♦ Sub-regional innovation stimulation
 ♦ (sub)Regionale InnovatieStimulering
 → <http://www.iwt.be/subsidies/vis-ris>
- VITO** ♦ Flemish Institute for Technological Research NV
 ♦ Vlaamse Instelling voor Technologisch Onderzoek NV
 → <http://www.vito.be>
- VKC** ♦ Flanders' Centre for Plastics
 ♦ Vlaams Kunststofcentrum
 → <http://www.vkc.be>
- VLAST** ♦ Flemish Academic Centre for Science and the Arts
 ♦ Vlaamse Academische Stem
 → <http://www.kvab.be/vlast.aspx>
- VLHORA** ♦ Council of Flemish University Colleges
 ♦ Vlaamse hogescholenraad
 → <http://www.vlhora.be>
- VLI** ♦ Flemish Aerospace Industries
 ♦ Vlaamse Vlaamse Luchtvaart Industriën
- VLIR** ♦ Flemish Interuniversity Council
 ♦ Vlaamse Interuniversitaire Raad
 → <http://www.vlir.be>
- VLIZ** ♦ Flanders Marine Institute
 ♦ Vlaams Instituut voor de Zee
 → <http://www.vliz.be>
- VLOR** ♦ Strategic Advisory Council for the education and training policy of Flanders
 ♦ Vlaamse Onderwijsraad
 → <http://www.vlor.be>
- VMDc** ♦ Flanders Marine Data and Information Centre
 ♦ Vlaams Marien Data Centrum
 → http://www.vliz.be/EN/Data_Centre
- VOKA** ♦ Flanders' Chamber of Commerce and Industry
 ♦ Vlaams netwerk van ondernemingen
 → <http://www.voka.be>
- VRI** ♦ Flemish Space Industries
 ♦ Vlaamse Ruimtevaartindustrie
 → <http://www.vrind.be>
- VRWB** ♦ Flemish Science Policy Council
 ♦ Vlaamse Raad voor Wetenschapsbeleid
- VRWI** ♦ Flemish Science and Innovation Policy Council
 ♦ Vlaamse Raad voor Wetenschap en Innovatie
 → <http://www.vrwi.be>
- VUB** ♦ Free University of Brussels
 ♦ Vrije Universiteit Brussel
 → <http://www.vub.ac.be>
- WAGRALIM** ♦ Agro-industries Competitiveness pole of Wallonia
 ♦ Pôle de Compétitivité de l'Agro-Industrie Wallonne
 → <http://www.wagrallim.be>
- WATS** ♦ Wireless Autonomous Transducer Solutions

- WELBIO** ♦ Walloon Institute for Life Sciences Lead
✦ Institut wallon virtuel de recherche
d'excellence dans les domaines des sciences
de la vie
→ <http://welbio.org>
- WHO** ♦ World Health Organisation
→ <http://www.who.int>
- WPS** ♦ Walloon Public Service
✦ Service Public de Wallonie
→ <http://spw.wallonie.be>
- WSN/RTLS** ♦ Wireless Sensor Networks/Real Time
Location System
- WTOCD** ♦ Scientific and Technical Research Centre
for Diamond
✦ Wetenschappelijk en Technisch
OnderzoeksCentrum voor Diamant
→ <http://www.hrdresearch.be>
- ZAP** ♦ Independent Academic Staff
✦ Zelfstandig Academisch Personeel

Belgian Report on Science, Technology and Innovation 2010

This publication, issued by the Belgian Science Policy Office in collaboration with the authorities of the Brussels-Capital Region, the Flemish Government, the French Community and the Walloon Region, presents Belgium's institutional environment regarding science, technology and innovation (STI) for a large audience. It also highlights the current policy orientations.

Another publication 'Key Data on Science, Technology and Innovation – Belgium, 2010' presents a set of key data on STI in Belgium and situates Belgium in an international environment.

Available online.
Interested readers can find up-to-date data and analyses on the following website: www.belspo.be



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