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Regional Innovation Monitor Plus

Regional Innovation Report Wallonia

To the European Commission
Enterprise and Industry Directorate-General
Directorate B – Sustainable Growth and EU 2020

technopolis |group|

Regional Innovation Monitor Plus

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technopolis |group| in cooperation with

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PREFACE

Launched in 2010, the Regional Innovation Monitor[1] continues to be one of the flagship initiatives of DG Enterprise and Industry of the European Commission. From the outset, it aimed at supporting sharing of intelligence on innovation policies in some 200 regions across EU20 Member States.

RIM Plus aims to help regions to improve their innovation policies based on better and harmonised policy intelligence. The new contract aims to contribute to the development of more effective regional innovation policies and promote policy learning.

Building upon the experience gained and results obtained during the implementation of the RIM in the period 2010-2012, the RIM Plus service evolves towards providing practical guidance to regions on how to use the collected information, establishing a network of regional experts with thematic specialisation, and organising specialised workshops taking into account the relevance and potential interest among the regional innovation policy makers.

RIM Plus covers EU-20 Member States: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the United Kingdom.

This means that RIM will not concentrate on Member States where the Nomenclature of territorial units for statistics NUTS 1 and 2 levels are identical with the entire country (Estonia, Latvia, and Lithuania), Malta which only has NUTS 3 regions, Slovenia which has a national innovation policy or Cyprus and Luxembourg which are countries without NUTS regions.

The main aim of 30 regional reports is to provide a description and analysis of contemporary developments of regional innovation policy, taking into account the specific context of the region as well as general trends. All regional innovation reports are produced in a standardised way using a common methodological and conceptual framework, in order to allow for horizontal analysis, with a view to preparing the Annual EU Regional Innovation Monitor Plus report.

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The present report was prepared by Nelly Bruno (Nelly.BRUNO@technopolis-group.com) supported by Johanna Castel and Léo Carcasses, all from Technopolis Group. The contents and views expressed in this report do not necessarily reflect the opinions or policies of the Regions, Member States or the European Commission.

The Regional Innovation Access Point and Knowledge Hub presenting further details of the regional innovation measures, policy documents and regional organisations in Wallonia is accessible through the RIM Plus online inventory of policy measures here: http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/region/select

[1] http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/

Executive Summary

1. Main Trends and Challenges in the Regional Innovation System

Over the last decade the economy of Wallonia has been catching up with the rest of Belgium and other more advanced EU regions. Even if Wallonia is still underperforming as regards its creation of wealth or its level of employment, the gap has decreased recently.

Wallonia is a small open economy, which has been coping relatively well with the effects of the economic and financial crisis, notably because of the policy focus on safeguarding jobs. In terms of innovation performance, after a decreasing trend over the period 2001-2005, Wallonia also witnessed a growth in R&D investment. Gross expenditures on R&D in Wallonia represented 2.27% of GDP in 2010. More than three quarters of these expenditures are incurred by the business sector, mainly by companies with more than 500 employees, although the vast majority of companies in Wallonia are SMEs. Most of the industrial activity in terms of R&D, value added generation and foreign direct investment concerns a limited number of sectors, the main ones are pharmaceutical and chemical industries. Although the industry is an important component of the regional economy, there has been very rapid growth in service activities.

In terms of human resources for research and innovation, Wallonia can count on a general good level of education, however the low level of tertiary education graduates in science and technology has been an issue of concern, together with the low diffusion of life-long learning practices.

Challenge 1: Tackling the under-financing of research and leveraging renewed growth of business R&D investment

Wallonia's research and innovation performance is characterised by a relatively high investment by enterprises and a general under-investment by the public sector. A small number of foreign owned companies play a key role in underpinning this strong performance and only few large companies in a limited number of sectors undertake considerable R&D investment. The challenge here is twofold, notably to increase public funding for R&D and leverage renewed growth of business R&D investment. Particularly, there is a scope of action to broaden the business base and reduce the dependence on strategic decisions taken by multinational companies abroad by means of focussed support for young innovative companies and through a series of measures, such as those aimed at improving the framework conditions for intellectual property rights as well as reducing the tax burden and administrative red tape.

Challenge 2: Matching knowledge production with the economic fabric

The region is characterised by a relatively large share of SMEs, which typically make lower R&D investment and have lower absorptive capacity for knowledge. The challenge here is to link the accumulated research capacities within the scientific research institutions and big industrial research performers to the economic fabric, in order to ensure that the economy is more resilient to future external shocks.

Several measures in place are aimed at ensuring the economic exploitation of research, but it seems that research outputs are not aligned with the absorptive capacity of the local economy dominated by the SMEs. Overall the number of patent applications is below the Belgian and EU-27 averages, whereas the low propensity to become an entrepreneur is also an issue of concern.

The recent change in policy from the support overly focussed on promoting technological innovation towards fostering service-oriented and/or entrepreneurial types of innovation (as it now happens within the small-scale Creative Wallonia programme) can be considered as a positive development. Since the public sector is a major job provider, actions to foster innovation within the sector would also be required to further boost the competitiveness and economic development of the region.

Challenge 3: Mobilising Human Resources for science and technology

In case additional funding is provided, the shortage of researchers will remain an important issue. While the region has strengths in terms of openness and international knowledge exchange and a well educated population, it needs to improve its human resource base. The share of graduates in S&T and engineering is insufficient given Wallonia's needs. Even if initiatives have recently been launched to improve the working conditions for researchers (Wallonia-Brussels Partnership for Researchers, refinancing of FRS-FNRS[2]), increasing the number of candidates choosing to enter the profession (e.g. awareness and image-improving campaigns), improving the number of graduates in the S&T domains, widespreading the use of life-long learning and creating easier access to the labour market for an increased number of foreign graduates are potential areas requiring actions.

2. Innovation Policy Governance

Belgium is a federal country with a highly decentralised research and innovation system, where the main responsibility for innovation policy and funding lies with the regions. Mandates for research and innovation policy are indeed distributed across several governments, which enjoy complete autonomy of decision-making power. Each level has its own ministries, departments, agencies and institutions. The competences of the federal and federated entities are clearly set to ensure a complementarity of interventions, however, in practice each entity is free to implement its own initiatives in its field of competences. In this regard it is important to note that since the adoption of the regional economic development plan in 2009 (called Marshall Plan 2.Green) there has been a genuine attempt to integrate policies at different levels of governance, between the Walloon region and the Wallonia-Brussels Federation, along with a higher level of cooperation with the region of Brussels-Capital.

The federal role is limited to tax measures, intellectual property law, corporate taxation measures (R&D tax credit), employment legislation and social security. Comparatively, the language communities (Dutch, German and French, known also as the 'Wallonia-Brussels Federation') are competent for matters related to scientific research and education, whereas Wallonia similarly to other regions in Belgium is competent for issues related to territorial matters such as energy, environment, and economic support, including innovation, applied and industrial research, technology transfer, etc.

3. Innovation Policy Instruments

Because of the autonomy of the regions in the federal structure of Belgium, Wallonia (and the Wallonia-Brussels Federation) has a wide range of research and innovation policy measures in place. In fact, the innovation policy mix is comparable to that of a national innovation system, except for tax incentives and several large research centres and infrastructures which are managed at federal level.

Particularly, a clear emphasis is put on measures aimed at fostering research industry collaboration and exploitation of research results. While the main research and innovation support measures at regional/community level tend to remain of a

[2] In the Wallonia-Brussels Federation, thanks to the refinancing of the F.R.S-FNRS, new research mandates can be supported since 2010 (but the number of permanent researchers is still set at 400).

horizontal nature, there has been a gradual shift towards sector specific initiatives through the thematic competitiveness poles absorbing a considerable share of regional funds, thematic research programmes and research institutes.

Also, strategic themes (most notably based on identified societal challenges) are defined as promising for the future and will guide the majority of future investments. The driving forces behind this specialisation are both economic (ensuring that the business sectors are assisted to reconfigure towards new competitive products or that new higher value added sectors emerge) and societal (e.g. dealing with environmental degradation and contributing to tackling climate change).

Improved access to finance for SME is also one of the priorities of the regional economic development plan, and various measures have been developed in this area (e.g Novallia which is supporting the financing of innovative projects in SMEs). Since the launch of the small-scale Creative Wallonia framework programme in 2010, a broader definition of innovation is being adopted, encompassing creativity and non-technological innovation and pilot measures are launched in these areas.

4. Conclusions: future actions and opportunities for innovation policy

- **Further streamline regional innovation policy and ensure increased institutional cooperation**

The (sub-)regional structures supporting innovation should be further streamlined, as started with the creation of the Enterprise and Innovation Agency in 2014. The OECD review (2012) is even suggesting breaking down barriers in the governance of innovation policy and distinguishing the functions of policy orientation (possibly through an inter-ministerial entity, which would encourage synergies with other regions, communities and at the external level), programming (possibly through performance contracts) and policy execution.

The regional research and innovation support system should also be re-organised around the competitiveness poles, whereas the thematic approach should be reinforced within existing research and innovation support structures. The overall objective here is to maximise existing synergies and improve the coherence of the system not only for the regional stakeholders but also outside Wallonia.

- **Take opportunity of the new policy cycle and of the new Structural Funds programming period to focus research and innovation support on areas with the highest innovation potential**

The public allocations for research and innovation have to be increased while encouraging more companies to get engaged in innovation. This has to be done in coherence with the regional smart specialisation strategy. The region needs to better orientate and focus the limited amounts of public funding available in domains with a high potential for the region, thus creating a critical mass, while offering a higher visibility not only outside Wallonia but also for the local stakeholders, in particular SMEs.

The Marshall Plan has introduced a series of support measures with different goals and objectives. Even if the regional innovation policy mix has evolved over recent years, it remains essentially based on grants (or reimbursable loans) for individual firms to undertake R&D aside from the federal R&D tax measures.

A stronger emphasis could be placed on instruments to facilitate the access to external sources of funding (risk capital) with the view of encouraging the creation and development of innovative companies. There is also a need to ensure that regional research and innovation stakeholders can receive an efficient support at all stages from basic research to commercialisation without facing gaps in funding nor delays.

The research and innovation policy measures should thus be streamlined and adapted to the needs of the regional economic structure. The approach of innovation (incl. non-technological innovation and demand-side innovation) should be further widened

to reach a broader audience (SME, individuals, public sector), while focussing the support on key domains for regional development.

In particular, the public procurement for innovation should be developed in the region based on the competences of the competitiveness poles, which should become the official backbone of the Walloon industrial and innovation policy. Their role as facilitator and integrator should be confirmed by better communicating on their results, actions and services to member and non-members. The existing results at the international level should be exploited and their integration into international partnerships and networks should be increased.

- **Develop more strategic and prospective exercises on the evolutions of jobs and competences in companies within the thematic areas of the Walloon competitiveness poles**

Strategic and prospective exercises should be performed to evaluate the evolutions of jobs and competences in companies in order to define needs in the poles' thematic areas on a five years time horizon. On this basis, poles should work together with training providers to adapt the existing offer or create new trainings if necessary. The training projects should then be strategically steered thanks to the monitoring of a set of relevant indicators.

- **Reinforce strategic intelligence throughout the policy cycle**

Although evaluation practices are evolving, an important number of support measures has not been subject to external evaluation. A wide-ranging evaluation and review of the whole innovation support system would be recommended, in order to focus regional support on initiatives with the highest potential to contribute to raising the intensity of industrial R&D and innovation (including service sector and non-technological forms of innovation). This also relates to the setting-up of efficient monitoring systems for all policies implemented.

1. Main Trends and Challenges in the Regional Innovation System

1.1 Recent trends in economic performance

Wallonia is one of the three regions of the Federal State of Belgium. The population amounts to 3.5m inhabitants and accounts for around 32% of the Belgian total. The region has a strong industrial tradition, being one of the economic powerhouses of Europe during the industrial revolution because of its abundant coal reserves and the early development of blast furnace technologies. However, difficulties to shift from an era of heavy industry and adapt to a more knowledge-based society have left Wallonia lagging behind the rest of Belgium and much of the EU.

Within the Belgian regions, Wallonia is ranked third in terms of gross domestic product (GDP) per capita with €24,100 in 2010 compared to €32,700 nationally[3]. In 2010, Walloon GDP (in purchasing power standard per inhabitant in % of the EU27 average) represented 88% of the EU average. After a long period of growth of the regional discrepancy from the EU average, the gap is slowly reducing since the economic crisis. Similarly, the unemployment rate remains stable in Wallonia since 2008 (app. 10%), while it grew up by three percentage points in the EU27 to reach 10.4% in 2012. According to an analysis from the Walloon Institute for Evaluation, Prospective Studies and Statistics (IWEPS, 2013), the economic slowdown since 2008 had indeed mainly an impact on the level of productivity whereas employment was rather preserved, thanks to diverse temporary initiatives targeting the safeguarding of jobs or the reduction of working time. Over the period 2003-2011, productivity has indeed increased by 0.4% per year on average in Wallonia, against 0.5% in Belgium and 0.8% in the EU27.

Although the industry is an important component of the regional economy, there has been very rapid growth in certain service activities like real estate, legal, health and social activities. The share of the service sector in the nominal value added accounted for some 76% in 2009. Comparatively, the value added generated by medium high-tech and high-tech industries reached the level of 6%. The employment in these industries represented 4.28% of the total employment in Wallonia.

According to calculations from the IWEPS the main industrial specialisation sectors of the region in terms of value added are: pharmaceutical industries, extractive industries, fabrication of rubber and plastic products, electrical equipment production, metallurgy and fabrication of metallic products[4]. According to data from the Walloon Business Federation (UWE, 2013) the vast majority (99.6%) of companies operating in Wallonia in 2011 were SMEs with 9 employees on average.

Wallonia is a small open economy. The Walloon exports amounted to 17% of the Belgian exports in 2012. The main clients of Wallonia are France, Germany and the Netherlands. The export to these neighbouring countries represented more than half of the regional export. The main exported products are chemical products, metals and machinery and equipment. Wallonia is also attractive for foreign investors: during the 2000-2012 period, foreign companies invested some €9.1bn in Wallonia, the main beneficiary sector being the sector of chemical products.

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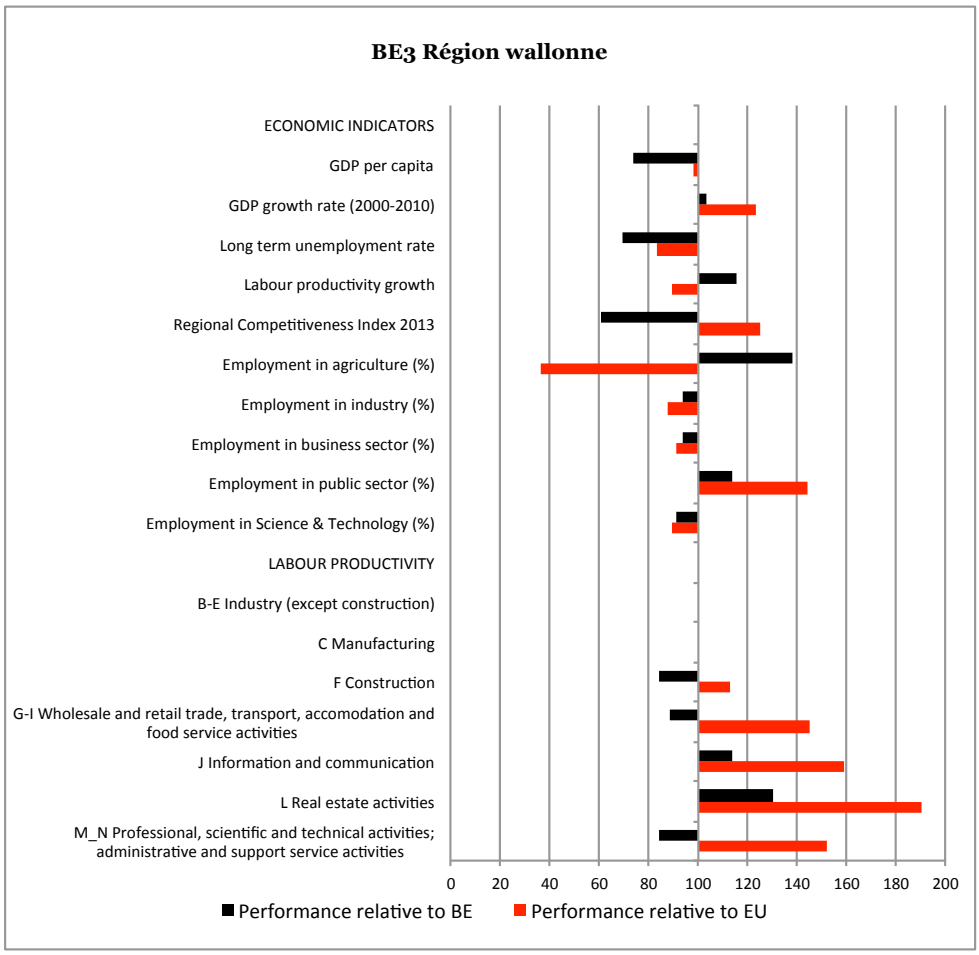
[3] One should however notice that the national GDP per capita is highly influenced by the value of the Brussels-Capital Region, which is approximately twice as high as the national average

[4] http://www.iweps.be/specialisation-sectorielle-en-fonction-de-la-valeur-ajoutee

Figure 1 Economic performance indicators

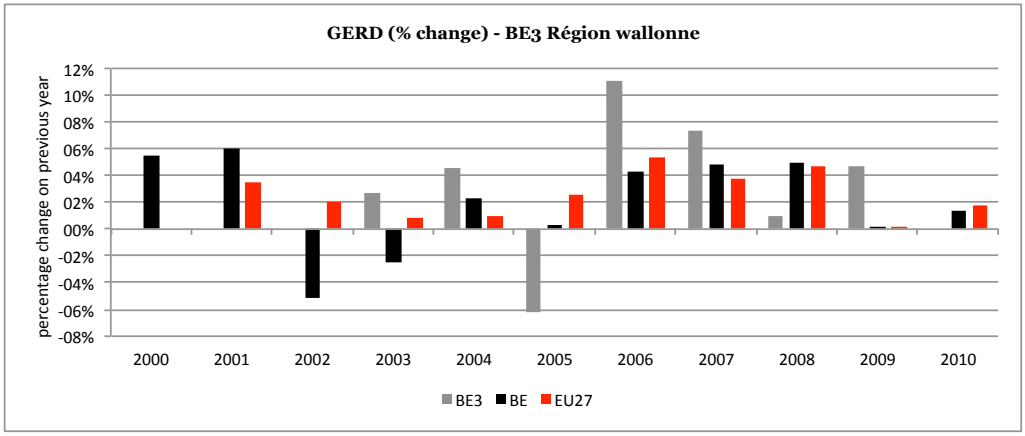


Source: Eurostat

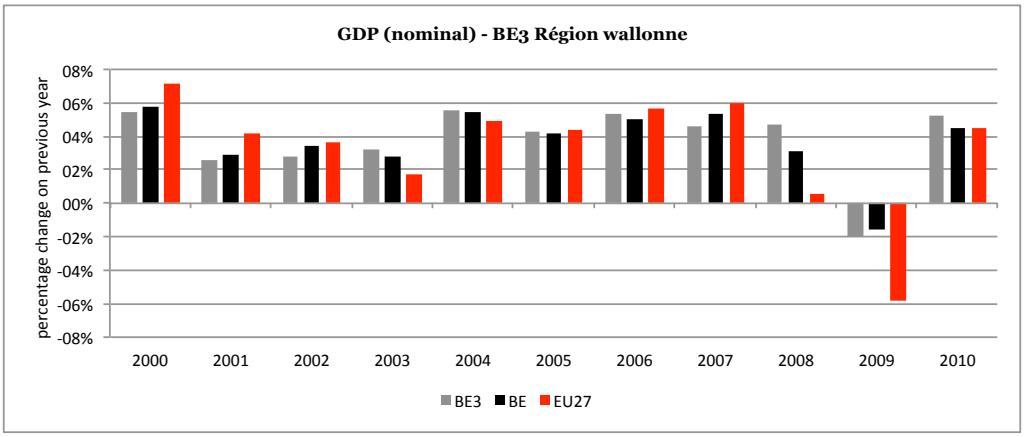
1.2 Recent trends in regional innovation performance

According to Eurostat data, as a percentage of GDP, gross expenditure on R&D (GERD) in Wallonia stood at 2.27% in 2010 (2.1% in Belgium, 2.01% at EU27 level) against 2.05% in 2008. Despite the slight increase of GERD since 2006, it however remains below the 3% target of GDP dedicated to R&D.

Figure 2 GERD and GDP trends



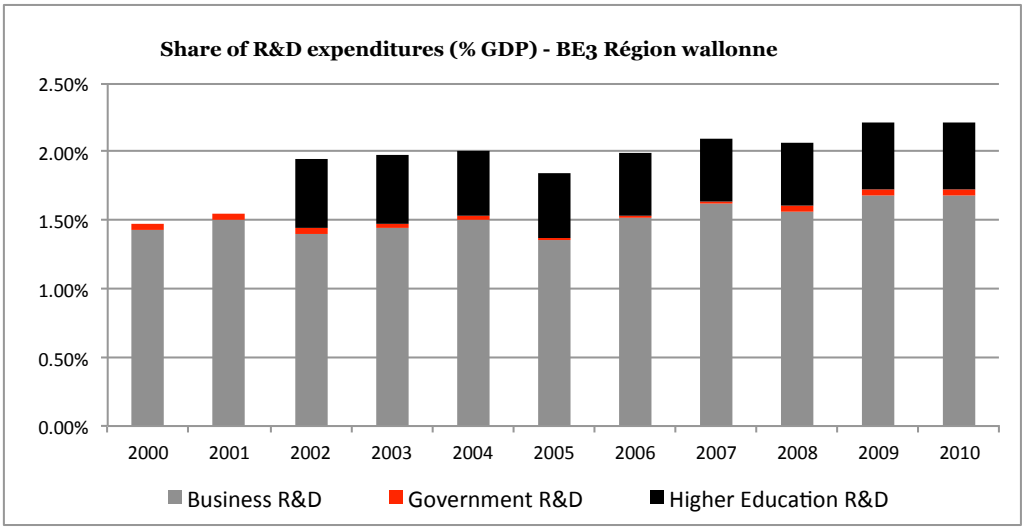
Source: Eurostat



Source: Eurostat

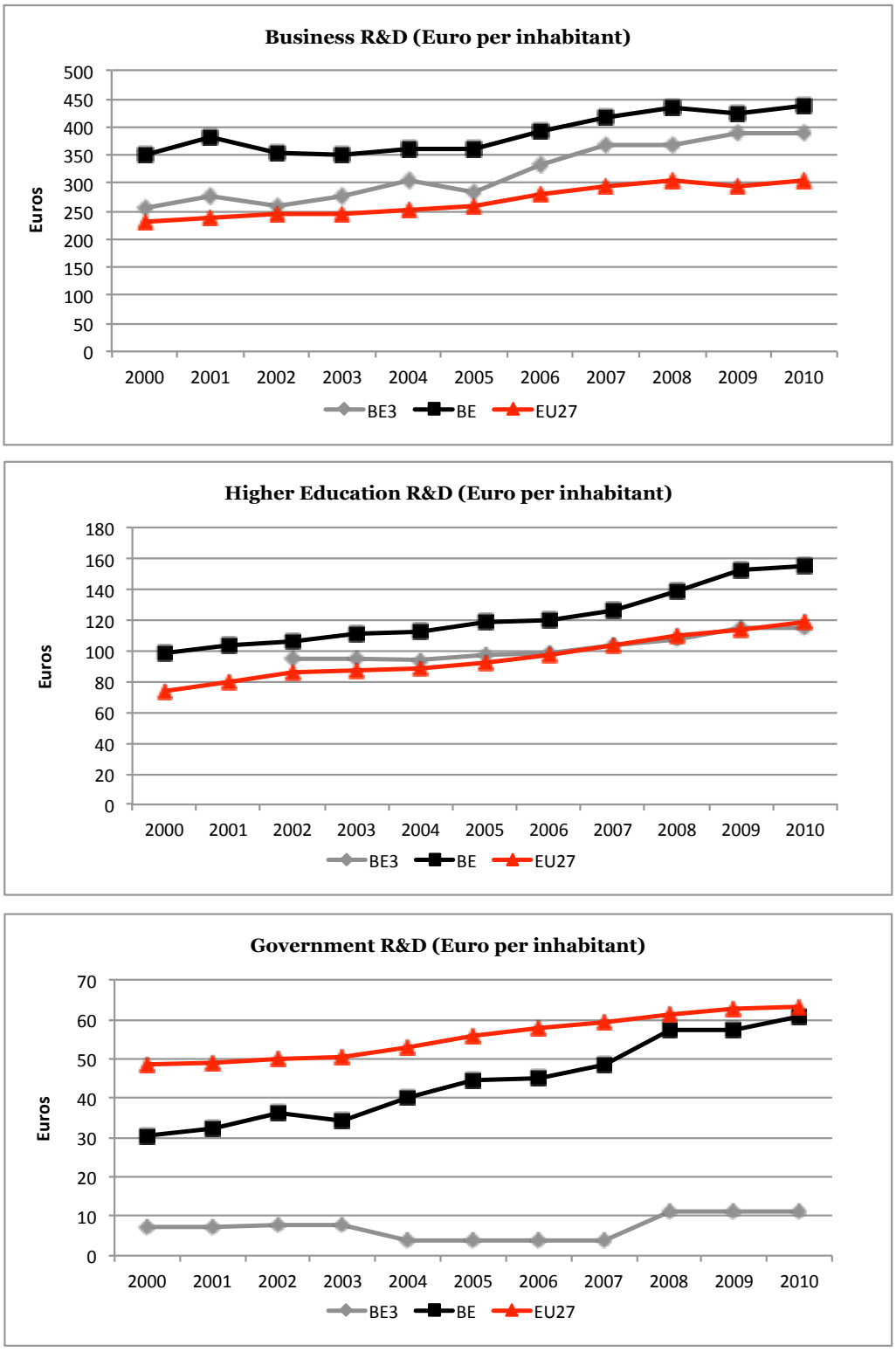
More than three quarters of the R&D expenditures in Wallonia are incurred by the business sector against 67% in Belgium and 61% in EU27. Also, the business R&D expenditures are considerably higher in the Walloon region (1.74% of GDP) than at national (1.41%) or European level (1.24%)..Comparatively, higher education and public sector R&D expenditures accounted for 0.5% of GDP and 0.03%, respectively.

Figure 3 Share of R&D expenditure per sector of performance



Source: Eurostat

Figure 4 R&D expenditure per sector of performance.



Source: Eurostat

Overall business R&D investment is undertaken by a small number of big multinational companies, whose decisions are often taken abroad. According to the latest available data from the Federal Planning Bureau, companies with more than 500 employees accounted in 2009 for 55.9% of total business R&D expenditures,

compared to 39.3% back in 2002. To put this number in perspective, it should be noted that 99.6% of regional companies are SME (UWE, 2013).

The chemical industry is the main business R&D investor with 59.8% of total BERD. Within the chemical sector, the pharmaceutical industry has a particularly strong position, representing alone almost half of the total Walloon business R&D investment. The manufacturing of aircraft and spacecraft, and manufacture of electrical machinery and apparatus accounted for additional 5.1% and 4.8% of BERD, respectively.

With regard to recent trends, it is also important to note that the Walloon entrepreneurial dynamism has been in progress over the last decade, which is illustrated by the net growth of active enterprises, which was estimated at 1.87%[5] in 2011 (2.22% in Belgium).

In terms of human resources for research and innovation, Wallonia has a good level of education. Some two-fifths of the population aged 30-34 attained tertiary education, according to the latest available data for 2012. The relatively good share of human resources in science and technology (HRST) (46.2% in 2012 – compared to 50.3% in Belgium and 42.9% in EU-27) is highly influenced by the activities of R&D intensive industries: 61% of the R&D personnel were active in the business sector in 2011

Particularly noteworthy is however that the share of tertiary education graduates in maths, science and technology is considerably lower in Belgium (no data at community level) with 17.1% in 2011 than in EU27 (22.6% in 2011), even if a slight upward trend could be noticed between 2010 and 2011 after a decade of decline. . Life-long learning is also a point of concern since years in the region with only 5.1% of the population aged 25-64 participating to life-long learning in 2012, in addition to low level of employment in medium high-tech and high-tech manufacturing as a share of total employment (4.63% in 2011).

In terms of patenting activity, the latest data from 2008 shows that with 114.31 EPO (European Patent Office) patent applications per million inhabitants, Wallonia is ranked lower than the country performance (142) and EU27 average (115). In particular, the share of high-tech patent applications to the EPO is low in Wallonia (12.4%) when compared to the Belgian average (25.3%). The main field of patenting is “Chemistry and metallurgy” (34% of patent applications), followed by “Performing operations and transporting” (23%) and “human necessities” (15%).

Compared to the results of the previous CIS (2008), the percentage of enterprises with innovation activities[6] has slightly increased in Wallonia from 52% to 57.6%. The majority of those companies are active in the manufacturing sector. While companies having between 50 and 249 employees recorded the highest growth of almost 9 percentage points (to reach 71% of companies), a downward trend of slightly less than 5 percentage points can be observed in large companies to reach 87%.

In 2010, 45.8% of companies in Wallonia declare having technological innovation activities, whereas 45.7% of companies introduced organisational or marketing innovation. Out of those companies undertaking technological innovation activities, the vast majority (67.6%) of companies reported the acquisition of machinery, equipment and software. According to the CIS2010 results, 41.3% of companies with technological innovation in Wallonia receive public funding for innovation. This is considerably more than in Belgium as whole with only 22.6%.

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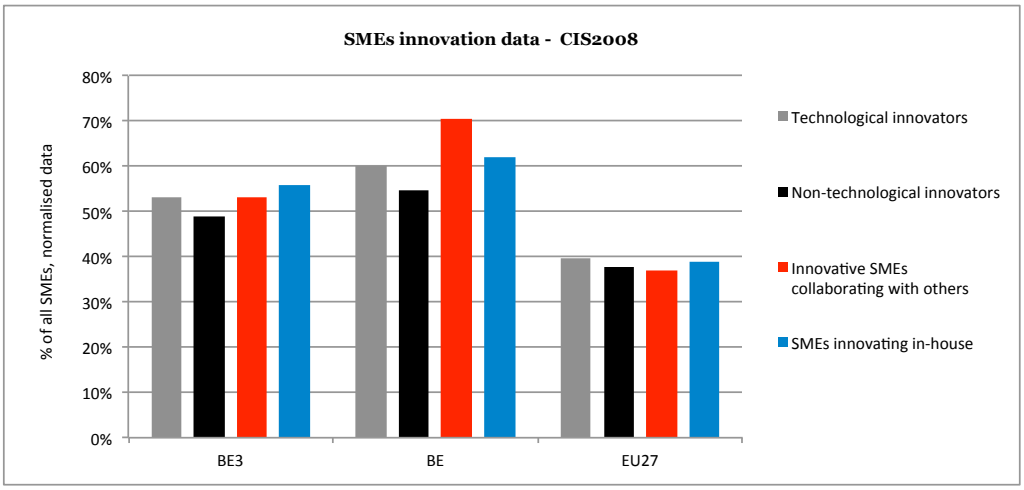
[5] Definition: Difference between the number of created enterprises and enterprises which ended activities, divided by the number of active enterprises. It takes into account the enterprises which are liable to VAT for the first time, the ones liable again, the enterprises no longer liable to VAT, the immigrations and emigrations on a monthly basis. The yearly business creation rate equals the sum of the twelve monthly rates of the year considered. Data from the SPF Economie, PME, Classes moyennes et Energie.

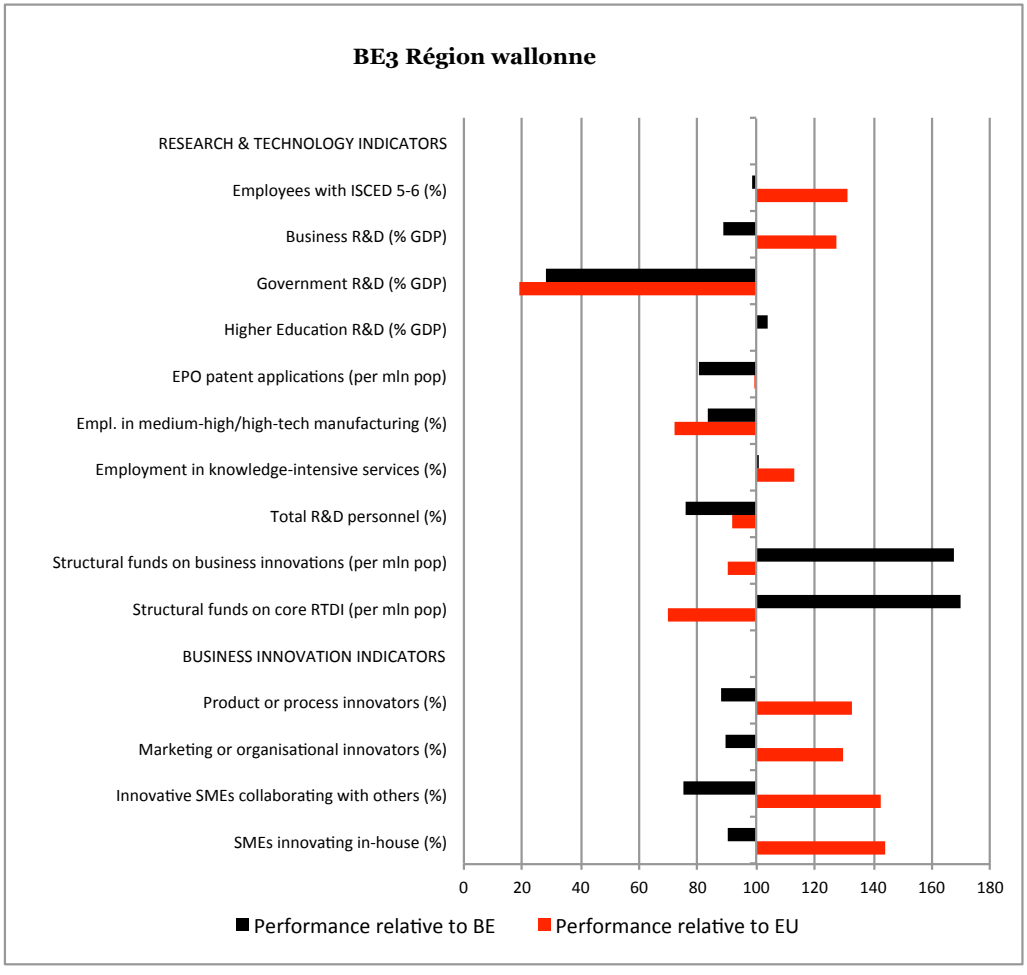
[6] i.e. that introduced innovations (product or process), or having realised innovation projects that have not yet been completed or have been abandoned

Figure 5 Technological & non-technological innovators



Source: Eurostat

Figure 6 Innovation Performance Indicators



Source: Eurostat

1.3 Identified challenges

Over the last decade the economy of Wallonia has been catching up with the rest of Belgium and other more advanced EU regions. Even if Wallonia is still underperforming as regards its creation of wealth or its level of employment, the gap has decreased recently.

Wallonia is a small open economy, which has been coping relatively well with the effects of the economic and financial crisis, notably because of the policy focus on safeguarding jobs. In terms of innovation performance, after a decreasing trend over the period 2001-2005, Wallonia also witnessed a growth in R&D intensity and R&D expenditures, above the Belgian and European average since 2006. Gross expenditure on R&D in Wallonia represented 2.27% of GDP in 2010. More than three quarters of these expenditures are performed by businesses, mainly by companies with more than 500 employees, although the vast majority of companies in Wallonia are SMEs. Most of the industrial activity in terms of R&D, value added generation and foreign direct investment concerns a limited number of sectors, the main ones are pharmaceutical and chemical industries. Although the industry is an important component of the regional economy, it has evolved towards the service sector, in particular housing, legal, health and social activities.

In terms of human resources for research and innovation, Wallonia can count of a good level of education of the population. Nonetheless, the low level of new tertiary education graduates in science and technology and limited life-long learning participation have been issues of concern over recent years. The region is also underperforming in terms of patenting activity.

Challenge 1: Tackling the under-financing of research and leveraging renewed growth of business R&D investment

Wallonia's research and innovation performance is characterised by a relatively high investment by enterprises and a general under-investment by the public sector. A small number of foreign owned companies play a key role in underpinning this strong performance and only few large companies in a limited number of sectors undertake considerable R&D investment. The challenge here is twofold, notably to increase public funding for R&D and leverage renewed growth of business R&D investment. Particularly, there is a scope of action to broaden the business base and reduce the dependence on strategic decisions taken by multinational companies abroad by means of focussed support for young innovative companies and through a series of measures, such as those aimed at improving the framework conditions for intellectual property rights as well as reducing the tax burden and administrative red tape.

Challenge 2: Matching knowledge production with the economic fabric

The region is characterised by a relatively large share of SMEs, which typically make lower R&D investment and have lower absorptive capacity for knowledge. The challenge here is to link the accumulated research capacities within the scientific research institutions and big industrial research performers to the economic fabric, in order to ensure that the economy is more resilient to future external shocks.

Several measures in place are aimed at ensuring the economic exploitation of research, but it seems that research outputs are not aligned with the absorptive capacity of the local economy dominated by the SMEs. Overall the number of patent applications is below the Belgian and EU-27 averages, whereas the low propensity to become an entrepreneur is also an issue of concern.

The recent change in policy from the support overly focussed on promoting technological innovation towards fostering service-oriented and/or entrepreneurial types of innovation (as it now happens within the small-scale Creative Wallonia programme) can be considered as a positive development. Since the public sector is a major job provider, actions to foster innovation within the sector would also be

required to further boost the competitiveness and economic development of the region.

Challenge 3: Mobilising Human Resources for science and technology

In case additional funding is provided, the shortage of researchers will remain an important issue. While the region has strengths in terms of openness and international knowledge exchange and a well educated population, it needs to improve its human resource base. The share of graduates in S&T and engineering is insufficient given Wallonia's needs. Even if initiatives have recently been launched to improve the working conditions for researchers (Wallonia-Brussels Partnership for Researchers, refinancing of FRS-FNRS[7]), increasing the number of candidates choosing to enter the profession (e.g. awareness and image-improving campaigns), improving the number of graduates in the S&T domains, widespreading the use of life-long learning and creating easier access to the labour market for an increased number of foreign graduates are potential areas requiring actions.

2. Innovation Policy Governance

Belgium is a federal country with a highly decentralised research and innovation system, where the main responsibility for innovation policy and funding lies with the regions. The research and innovation policy is overseen by several governments, which enjoy complete autonomy of decision-making power. Each level has its own ministries, departments, agencies and institutions. Formally, there are seven independent Belgian authorities each carrying out their own policy in the wider field of research and innovation, notably the federal government, the regions and the language communities[8].

The mandates with regard to research and innovation are distributed as follows:

- The federal level retains competence for a limited number of specific policy fields that can influence the innovation system, such as scientific research in the remaining federal science institutes, intellectual property law, corporate taxation measures, employment legislation and social security.
- The language communities are competent for matters related to persons including scientific research and education, including the universities and university colleges “Hautes-écoles”. The implementation of the policy is placed under the Directorate General for non-obligatory Education and Scientific Research. The community has a dedicated public body in the National Fund for Scientific Research (within the French-speaking part of Belgium, F.R.S-FNRS), which is in charge of university funding.
- The regions are competent for issues related to territorial matters such as energy, environment, and economic support, thus including innovation, applied and industrial research, technology transfer, etc.

The distributed competences for research and innovation matters across the Belgian authorities imply the need for co-ordination on both a permanent and ad hoc basis. The 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 for Science Policy

[7] In the Wallonia-Brussels Federation, thanks to the refinancing of the F.R.S-FNRS, new research mandates can be supported since 2010 (but the number of permanent researchers is still set at 400).

[8] Federal authority, the Region of Flanders, the Region of Wallonia, the Region of Brussels Capital, the Flemish-speaking Community, The French-speaking Community, the German-speaking Community. In practice, there are five active entities in research and innovation policy: Flanders & the Flemish community have merged into one entity and the German community does not have a research policy, due to its small size.

(CIMPS/IMCWB)[9], whose main focus remains science policy, with most agreements reached touching solely on scientific research. It has established two permanent sub-committees CIS (International Cooperation) and CFS (Federal Cooperation), where attention is also given to innovation policy (monitoring the EU innovation programmes and coordinating R&D and innovation statistics). The Federal Council for Science Policy (CFPS-FRWB) gives policy advice, primarily concerning science. The reports from the OMC peer review (Boekholt & Georghiu 2011) put emphasis on a need for increased coordination between the different policy levels in Belgium. Interestingly, a joint action plan shared by Flanders, Wallonia and the Walloon-Brussels Federation for recovery through R&D was adopted by the three Governments on 7 December 2012. This aims to take a series of actions around three areas: launch of joint calls for projects, strengthening collaboration between regional and community actions and definition of common positions, particularly at European and international level.

At the federated level, it is important to note that since the regional/community elections and the adoption of the regional economic development plan in 2009 (called Marshall Plan 2.Green) there has been a genuine attempt to integrate policies at different levels of governance, between the Walloon region and the Wallonia-Brussels Federation in particular, but also along with a higher level of cooperation with the region of Brussels-Capital.

A single Minister-president chairs the two governments of the Walloon region and the Wallonia-Brussels Federation and several other ministers have portfolios both for regional and community affairs. The aim is to enhance the level of coherence of government action in a number of policy fields. Scientific research is now part of the portfolio of a single minister, dealing with both regional and community aspects. Similarly, the Minister in charge of business support (incl. innovation) and ICT policy at regional level is also responsible for higher education at community level. Other ministers from either government are autonomously responsible for funding research and innovation in their specific fields of competence (agriculture, environment, energy, health).

Also, the cooperation between the French-speaking entities and the region of Brussels-Capital has been reinforced, notably thanks to the set-up of a French-speaking commission at the policy development level to discuss on research and innovation initiatives on a regular basis. In February 2013, the Governments of Wallonia and the Walloon-Brussels Federation approved the implementation of a shared administration between two federated entities that will be responsible for administrative simplification and e-Government, known also as 'e-Wallonia-Brussels Simplification' (eWBS).

The Ministerial cabinets, in consultation with the public administrations are responsible for policy development. The Walloon Science Policy Council provides advice to the Walloon Government regarding research and innovation policy. The Council, created in 1990, is one of the commissions of the Economic and Social Council of the Walloon region and is composed of representatives of social partners (industry, trade unions), universities and higher education institutions, research centres and of the Walloon Government. It should also be noted that in May 2011, the Walloon Government decided to set up an Institute of Technological Assessment hosted by the Walloon Parliament. Two main missions have been defined: helping policy-making in science and technology and stimulate societal debate through participatory methods.

The implementation of innovation policy in the region is based on the Decree covering research, development and innovation activities in Wallonia adopted in July 2008,

[9] 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 matters

which is currently under revision to adapt to the changing rules of the European Framework for R&D support. The decree sets out the conditions of public support to public research organisations, universities, research centres and businesses.

In line with government statements, the Parliament of the Wallonia-Brussels Federation has adopted in November 2013 a Decree redefining the landscape of higher education. Being the result of a reflection of more than three years, the new decree will be phased in from September 2014. It establishes a common organisation for all higher education institutions (universities, colleges and art schools) and creates a unique Academy of Research and Education (ARES[10]), a structure created on 1 January 2014 as the steering body of higher education in the Wallonia-Brussels Federation. In a nutshell, ARES will be organised in five geographic clusters that will also gather into academic areas for certain issues. The main objective here is to put universities, "hautes-écoles", arts schools and social advancement colleges at the same level with the view to facilitate networking. The decree also reforms the evaluation, graduation and student mobility systems.

In parallel, the 22 applied research centres that are accredited by the Walloon region are merged into seven institutes, in order to simplify the system but also to guarantee cohesion among the thematic areas covered. A body called WAL-TECH will oversee these institutes and be tasked with ensuring the visibility of the institutes and managing internal collaboration. The objective is to improve the service provided to businesses, in particular SMEs, wishing to improve their process or to develop a new product.

The table below provides a summary overview of innovation policy governance. It has to be noted that a new reform of the State has been voted end December 2013. It will come into force on 1st of July 2014. It notably foresees the transfer of a number of competences (incl. social benefits, employment and health), between the Federal level and the federated entities in the country. In particular, the regions will gain a great level of fiscal autonomy.

Table 1 Innovation Policy Governance

	Description	Comment
Degree of general regional autonomy	Federal country with very high level of general regional autonomy It is not a system where the federal government coordinates and decides on a national policy framework that each region then fine-tunes to its own needs and situation. On the contrary, all three regions (and the communities) have close to full autonomy in managing their policies in their fields of competence.	Federal country with a strong level of regional autonomy in an increasing number of areas Since the early 1990s, an increasing number of policies has been decentralised across several governments, each enjoying complete autonomy of decision-making power in these matters.
Degree of autonomy with regard to innovation policy	High autonomy with regard to innovation policy, which is a regional competence. The federal level retains competence for a limited number of specific policy fields that can influence the innovation system, such as scientific research in the	Belgium is a federal State where innovation policies are mainly addressed at the regional level (except for taxation of companies and standardisation dealt with at federal level). Community level competent for issues related to higher education

[10] Since 2007, universities of the Wallonia-Brussels Federation are structured into three academies: Louvain, Wallonie-Bruxelles and Wallonie-Europe.

	Description	Comment
	remaining federal science institutes, intellectual property law, corporate taxation measures, employment legislation and social security. The communities are competent for matters related to persons including scientific research and education (including the universities and university colleges "Hautes-écoles"). The regions are competent for issues related to territorial matters such as energy, environment, and economic support, thus including innovation, applied and industrial research, technology transfer, etc.	and research in higher education institutions Increased attention paid to the need of coordinating policies at the level of the region and community in Wallonia and the Wallonia-Brussels Federation (Marshall Plan 2.Green, Research Strategy 2014-2020)
Set-up of regional governance system	Highly decentralised research and innovation governance system(s) Federal country characterised by a multi-level governance of research and innovation policy as the federal government and the three regional and three language community governments all have competence for certain matters relevant to science and innovation.	There is no hierarchy of powers between the federal government and the other authorities. The regions and communities coordinate their own specific policies through the regional governments and agencies.
Nature of the process of strategy development	Innovation policy mainly developed top-down: programmes/initiatives launched in areas where Wallonia is regarded as having a potential.	Some initiatives have included participatory approaches for strategy development (e.g. Creative Wallonia)
Intra- and inter-regional co-operation	High level of intra-regional cooperation Focus on the support of regional stakeholders and opening up at international level rather than inter-regional cooperation within Belgium. Multiple stakeholders in the different layers of regional governance of the innovation system but recent streamlining effort: creation of the Enterprise and Innovation Agency and of the Academy of Research and Education	Cooperation between the regions of Brussels-Capital and Wallonia is increasing with some regional programmes being slowly opened up to stakeholders from the other region (based on funding from the home region), but this is much less the case as regards cooperation between Wallonia and Flanders. Within some European programmes promoting interregional cooperation, such as INTERREG, the regions of Wallonia and Flanders do however cooperate with French border regions. This is more an exception than a rule, and partners tend to be found generally in other countries than in Belgium. The remaining responsibilities of the Federal Government, in fields such as taxation, corporate law (including intellectual property), mean that the implementation of certain regional initiatives may be conditional on coordination with Federal policy.

At the level of policy implementation, the Directorate General operational for Economy, Employment and Research (DGO6) of the Walloon Public Service is responsible for the implementation of policy and administration of all Walloon R&D programmes targeted to research organisations and companies. The DGO6 was created in 2009 following a reorganisation of the regional administration and the creation of the Walloon Public Service[11]. Its overall mission is to implement and monitor the aid granted in the field of economic policy - including the support granted within the framework of EU programmes - and to encourage the development of enterprises, especially SMEs. In particular, it manages all measures and initiatives for industrial research and development of experimental products, processes and innovative services, including selection, funding and monitoring of projects. The DGO6 also provides support to clusters and co-ordinates the competitiveness poles support measure. More generally, the DGO6 can allocate funds to four broad categories of actors in the field of R&D support:

- Universities and higher education institutions: funds are to be used for industrial research projects relevant for regional socio-economic development;
- Accredited research centres: to carry out applied research and technology diffusion activities for regional companies;
- Innovative companies: supporting R&D and innovation projects; and
- Technological innovation partnerships: also called PIT, consortia of companies and research institutions.

University interfaces, which support the economic exploitation of research results and are active in IPR management, are also supported through the DGO6.

It can be noted that Wallonia and the Wallonia-Brussels Federation are implementing their administrative simplification plan 'Let's Simplify Together Plan 2010-2014' and the 'Industry Action Plan'. Work is also currently underway within the DGO6 (by the " SME Envoy") on the Walloon Small Business Act (SBA) aiming at improving the coordination and coherence of the Walloon system for greater efficiency and clarity for SMEs and entrepreneurs.

End 2013, the creation of the Agency for Enterprise and Innovation (AEI) was voted by the Walloon Parliament. This Agency will result from the integration of the current Agency for Technology Promotion (AST, created in 2006[12]), which is promoting innovation and innovation networking, and the Agency for Economic Promotion (ASE, created in 2007) tasked with ensuring the coordination of business support. The AEI will provide support services and assistance for the economic, technological and digital development of Wallonia ("one-stop shop"). The current Walloon Telecommunications Agency (AWT, created in 1999), which is a Public Interest Organisation established by the Walloon Government to ensure the development and dissemination of Information Technology and Communication (ICT) in Wallonia, will become a subsidiary of the AEI and renamed as the Walloon Agency for Information and Communication Technologies (AWTIC). According to the official press releases, the establishment of the AEI would respond to a clear demand from entrepreneurs (as

[11] The Walloon administration is currently undergoing modernisation, in particular through the implementation of the first strategic plan of the Walloon Public Service (SPW), AVANTI ("Towards a new innovative matrix organisation") which was adopted by the Walloon Government in February 2012. It is "*to initiate a culture of change, focused on efficiency, quality, accessibility and transparency to put the satisfaction of the users at the heart of the concerns of SPW*."

[12] Following an evaluation of the networks of intermediaries and in order to tight up the links within and between the three families of scientific and technical intermediaries that exist in Wallonia, the Walloon region has set up the AST in 2006 (Technological Stimulation Agency), in charge of improving the coherence of the system by exploiting fully the complementarities between the different actors. The AST is also in charge of the management of the innovation grant directed towards innovative SMEs launched in 2008.

reported within the framework of the evaluation of the AST and the ASE), looking for the "*removal of redundant structures, the clarification of the missions of the current Agencies for the sake of greater coherence and efficiency benefiting ultimately not only businesses, but the economic and technological development of Wallonia in general*".

The main regional stakeholder involved in the financing of companies in Wallonia is the SRIW (Walloon Regional Investment Company), which provides finance within and outside Belgium for businesses undertaking industrial projects or providing services that generate added value. In particular, its subsidiary SOWALFIN (Walloon Company for Finance and Guarantees for SMEs, created in 2002) provides Walloon SMEs with guarantees, co-financing and other specific financial services with some specific instruments dedicated to innovative companies and in particular spin-offs. The Walloon Region has in particular mandated the SOWALFIN to establish and manage a system of integrated finance in the form of a fund to promote the economic commercialisation of research results in the form of the creation of spin-offs. The region made funds available to SOWALFIN and its local subsidiary investment companies (or Invests) with a view to these companies taking a stake, either in the form of equity or quasi-equity, in pre-seed capital funds in partnership with regional universities, industry and research centres. The Walloon government has also appointed SOWALFIN with the additional task of promoting the financing of innovative projects in SMEs. The subsidiary Novallia was created for this purpose in 2009 with a budget of €46m, co-financed by the Walloon Region and the Structural Funds, to intervene with subordinated loans at fixed rates.

Other key stakeholders of the regional innovation system are the business angels networks. In particular, the Be Angels network, which was created in 2007 following the merger of two business angels networks of Wallonia and Brussels-Capital, is connected to other extra-regional sources of financing and receives support from the regions of Wallonia and Brussels-Capital. Another initiative is the cross-border private investment platform Northern France – Wallonia, which is led by two organisations, namely the Business Angels of Northern France and WABAN (Wallonia Business Angels Network). This partnership is funded in part through the European Programme INTERREG as well as through the Walloon Region and the Regional Chamber of Industry of Nord Pas-de-Calais in France.

The table below provides an overview of the innovation policy institutional set-up and available human resources in Wallonia.

Table 2 Innovation Policy Institutional Set-Up and Available Human Resources

Policy stage	Primary organisation	Number of personnel directly in charge	Total number of employees	Summary assessment
Strategy development	Cabinet of the Ministers in charge and DGO6, Walloon Public Service	n/a	n/a	data not available
Programming	DGO6, Walloon Public Service		app. 600 employees	data not available
Implementation	DGO6, Walloon Public Service		app. 600 employees	The DGO6 is the main entity in charge of the implementation of the innovation policy but many other stakeholders are involved in Wallonia (AST, ASE)
Monitoring and evaluation	Walloon Institute for Evaluation, Foresight and	9 persons in the Economy department and 6 in	50 employees	Institute created in 2004

Policy stage	Primary organisation	Number of personnel directly in charge	Total number of employees	Summary assessment
	Statistics (IWEPS)	the Evaluation department, in 2012	in 2012	In charge of the implementation of only a subset of Walloon initiatives related to innovation Most of the (few) evaluations are commissioned to external evaluators.

Note: The values provided are approximates from the author based on available data.

3. Innovation Policy Instruments and Orientations

3.1 The Regional Innovation Policy Mix

Because of the autonomy of the regions in the federal structure of Belgium, Wallonia (and the Wallonia-Brussels Federation) has a wide range of research and innovation policy measures in place. In fact, the innovation policy mix would be comparable to that of a national system, except for tax incentives and several large research centres and infrastructures overseen at federal level.

The Walloon region did not have a regional (research and) innovation strategy per se until end 2011. Priorities as regards research and innovation policy were instead included within the broader socio-economic development plan of the region. Following the regional elections in 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 (Plan Marshall 2.Vert[13]).

This plan, which has a budget of €1.6b over five years (2009-2014) is a continuation and a reinforcement of the first Marshall Plan (2006-2009)[14]. The objectives of stimulating competitiveness and creation of businesses and jobs are at the heart of this Plan, where the competitiveness poles and clustering policy play a key role, showing the clear streamlining of the regional policy over the years towards domains demonstrating high potential for regional development. The addition of 'Green' underlines the new orientations to better integrate 'sustainable development' as a crosscutting priority.

More precisely, the Marshall Plan 2.Green focuses on 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 future;
- Priority area 4: Create a favourable framework for creating business and quality jobs;

[13] http://planmarshall2vert.wallonie.be

[14] With the first Marshall Plan covering the period 2006-2009, the government had focused a budget of €1b on five priorities: the development of five competitiveness poles, the stimulation of the creation of activities, the reduction of taxation on business, the reinforcement of research and innovation support, vocational training and the mobility of workers.

- Priority area 5: Develop 'Employment – Environment' alliances;
- Priority area 6: Increase employment and infrastructure in the sector of personal services.

The priorities translated into a set of initiatives dealing specifically with innovation policy:

- Reinforcing investment in basic research through the implementation of the second development plan of the National Scientific Research Fund (FRS-FNRS);
- The continuation of programmes started within the first Walloon Marshall Plan: programmes of excellence (for excellent research in higher education institutions and research centres), mobilising programmes (supporting applied research on specific themes of relevance for the region), support to competitiveness poles (cooperation industry-research-training in six specific domains, creation of a sixth competitiveness pole dedicated to green technologies in 2011), support for research commercialisation through the creation of spin-offs (FIRST programmes and in particular FIRST Spin-off and FIRST Enterprise which enables companies to hire a researcher for a given time and a given industrial research project);
- A continued support to partnerships between university academies and between research actors and industry as well as for the involvement of companies and in particular SMEs in European programmes;
- Calls for specific projects dedicated to technological innovation partnerships (with a view to encourage partnerships between companies and between research institutions and industry, outside the framework of competitiveness poles); and
- Support to 'proof of concept' strategies via the dedicated knowledge transfer offices within universities and via the technology incubators.

A clear emphasis has been put on measures aimed at fostering research industry collaboration and exploitation of research results. While the main research and innovation funding measures at regional/community level tend to remain of a horizontal nature, there has been a gradual shift towards sector specific initiatives through not only the thematic competitiveness poles absorbing a considerable share of regional funds (e.g. aerospace, agro industry, mechanical engineering, life sciences and health, logistics, and green technologies), but also through thematic research programmes and research institutes (including the new research centres WELBIO and WISD) and the programme for public-private partnerships.

Also, strategic themes (most notably based on identified societal challenges) are defined as promising for the future and will guide the majority of future investments. The driving forces behind this specialisation are both economic (ensuring that the business sectors are assisted to reconfigure towards new competitive products or that new higher value added sectors emerge) and societal (e.g. dealing with environmental degradation and contributing to tackling climate change).

Improved access to finance for SME is also one of the priorities of the Marshall Plan 2.Green and various measures have been developed in this area in particular through the SOWALFIN and its subsidiary Novallia. Furthermore, in the context of the Walloon SBA (Small Business Act) launched in 2011, the financing of SME was identified as a priority and new ideas are currently being examined, including recourse to European finances (European Investment Bank/European Investment Fund), facilitating mobilisation of private savings to finance SME, development of "investment readiness" support measures and facilitation of recourse to bank credit. In 2012, the Walloon government also set up a measure to help new small businesses with recruitment and financing for expert managers on specific missions: the CxO measure.

In order to supplement the sectoral approach of the Walloon competitiveness clusters with a geographical approach that would allow the region to better adapt to the different needs of investors, depending of their region of origin, specific offices located

near the Walloon science parks have been established since 2010. The overall objective is to support the localisation of foreign innovative companies in the region.

Within the framework of the Marshall Plan 2.Green, the Research Strategy 2011-2015 "Towards an Integrated Research Policy" of Wallonia and the Wallonia-Brussels Federation was published end 2011. It aims at increasing cooperation between the different policy levels in the field of R&D and a more integrated and coherent policy for research and innovation. Although technically a policy statement of the Walloon - Wallonia-Brussels Federation governments, an additional aim of the Strategy is to develop a joint action plan with the Brussels-Capital region. The document sets out eight strategic objectives, identifies five priority thematic areas and includes a detailed plan of action for meeting the objectives. The eight overall objectives are the following:

- Complementarity of tools between different institutional levels;
- Towards 3% of GPD dedicated to R&D;
- Logic of partnerships and economic exploitation of research;
- International influence;
- Reinforcement of capacities: awareness raising on scientific careers and improvement of the researcher's career;
- Definition of a strategic research around five themes;
- Evaluation of research conducted and adoption of a prospective approach;
- Strengthening the relationship between science and society.

The five thematic fields identified are: sustainable development, energy, research in technological fields, health and ageing and quality of life.

Another action of the Marshall 2.Green aimed at developing a *new strategic plan for innovation of Walloon businesses*. The framework programme Creative Wallonia was thus initiated in 2010, as the outcome of a regional reflection process on the ways forward to boost the development of the region.. The participatory process of programme development (the so-called Zenobe Commission) pointed out three cross-disciplinary priorities for Wallonia that are integrated in Creative Wallonia actions, notably better adapt and tailor policies, contents and education tools to the Walloon culture; facilitate appropriation of Walloon identity by youngsters; and increase the internationalisation of education practices and the active promotion of innovation culture.

The original ambition of the programme is to put innovation (with a broader scope than technological innovation) and creativity at the centre of the economy and society in Wallonia by breaking down the traditional barriers between administrative departments and promoting collaborative approaches. The main philosophy of this programme is thus to establish a crosscutting dynamic between regional stakeholders (businesses, public sector, general public, education institutions…), so as to make Wallonia a *true creative and knowledge-based society*. This programme, which has currently an average budget of €8m per year[15], is under the responsibility of the Walloon Minister of Economy and New Technologies, and managed by the DGO6. A steering committee, which is composed of regional innovation stakeholders (ASE, AST, AWEX, WBI, DGO6, Cabinet of the Minister), was also created to monitor and steer the programme. The programme adopts a decentralised approach with the implementation of most of the measures done in co-operation with a set of regional organisations, most notably the AWEX, universities and higher education institutions, the AST, the ASE, Wallonie Design and the AWT, but also other types of structures dedicated to creativity and learning such as theaters, design studios, etc.

[15] Interview de Jean-Claude Marcourt, 15/04/2013, page link

The programme covers three main areas, including the promotion of the society of creativity, the development of innovative practices and the support for innovative production. It relies on three types of intervention:

- The first type of intervention is about fostering the emergence of innovative projects, by helping SMEs to commercialise their products or services or supporting entrepreneurs to establish new businesses. The goal of these instruments is to financially assist enterprises that do not have sufficient means to market already developed innovative prototypes. For instance, the call for projects "Boost-Up/Creative Industries", which is managed by *Wallonie Design,* allocates grants from €40,000 up to €140, 000 to entrepreneurs of the creative industries, in order to favour the market introduction of their projects. Nest'up is another instrument aiming at reaching a similar objective but by coaching entrepreneurs to develop their start'ups. This "start'up accelerator" is particularly active in communication events in order to promote the innovative projects to potential investors. Some other actions like OP'IN rather directly support enterprises that want to implement new practices/processes within their organisations, by providing grants covering between 15% and 35% of the expenditures, depending on the size of the company.
- The second type of intervention is about promoting the know-how on innovation matters. This area strives for awareness to creativity through training programmes and promoting events. The expected outcomes are also a skill improvement of entrepreneurs, students and the public sector on innovation matters, a stimulation of exchanges, and a better international visibility of the Walloon innovative potential. An example is the "Executive Master in co-creation Innovation" launched in September 2013 at the University of Liège (IDCampus). This training certificate allows enterprises, associations and students to learn how to introduce creative tools and methods within their practices. Some others actions of this intervention area deal with the wider communication on the Walloon achievements, for instance through the annual organisation of the Week of Creativity.
- Finally, the third type of intervention concerns the stimulation of new innovative uses or practices. The goal is to ensure the spreading of good practices and convincing experiences, and reinforce the potential for local and international cooperation on innovation matters. "Creative People" is for instance a call for projects that promotes the implementation of innovative initiatives that make the society sensitive to creativity (individual grants of maximum €35,000 per year). Other measures are more focused on cooperation, like CoWallonia which is a fund supporting the creation of eight co-working centres in Wallonia. CoWallonia is implemented by the AWT.

Creative Wallonia is a hybrid programme which is thought as a lab of ideas. In practice, initiatives are launched and supported depending on identified needs. The programme aims to remain open to new ideas but this is also related to the fact that the programme does not have a multi-annual budgetary framework, and is still in its early years. Not all of the actions have been launched yet and some might not be continued depending on the results achieved. An external evaluation of the programme is currently underway and is due to be completed by April 2014.

Apart from policies to improve working conditions for researchers (salary, career prospects, financing for projects) increasing the number of candidates choosing to enter the profession (e.g. awareness and image-improving campaigns), improving the number of graduates in the S&T domains and creating easier access to the labour market for an increased number of foreign graduates are areas requiring actions. To this end, a number of programmes have been setup at the community and regional

level, and the Wallonia-Brussels Partnership for Researchers[16] has been launched in 2011. It is worked out in twenty-five actions divided into six chapters, where public authorities undertake, alongside the actors in research, to place researchers at the centre of the priorities given to the consolidation of research as a driver of the future: Open recruitment and portability of subsidies; Social security, tax system, visas and other matters falling under federal authority; Employment and working conditions; Training of researchers; Gender equality; and Access to Job Market for PhD Holders.

Lifelong training and improvement of balance between supply and demand are also the focus of a particular effort from the Governments with the support of Structural Funds. Firstly, through targeted reinforcement of training provision, in particular for occupations suffering from shortages, or in demand (green occupations, competitiveness poles, ICT), and languages. Secondly, through the development of training including work placement, of vocational education and closer collaboration with sectoral federations. Overall the priorities retained for the 2014-2020 programming of Structural Funds in Wallonia are closely connected with the targets of the Europe 2020 Strategy and the regional development priorities of the Walloon Government (Marshall Plan 2.Green and Marshall Plan 2022).

A new Marshall Plan covering the period 2015-2022 is currently under preparation and will be structured around two main lines:

- *A competitive economy at the heart of the third industrial revolution including energy transition*: this includes the development of an explicit research and innovation strategy for the region/community, in line with is smart specialisation
- *A quality provision of education and training oriented towards employment, personal and collective development.*

To sum up, the regional innovation policy mix has evolved from a clear focus on industrial research until 2005 (clusters policy and industrial research support), to the implementation of support measures to encourage public-private partnerships in specific sectors of importance for the region (incl. competitiveness poles, mobilising programme, technological innovation partnerships) and specific measures to support knowledge transfer and the reinforcement of technological capacities of SMEs (incl. creation of the Agency for Technology Promotion-AST in 2007, technology vouchers).

The overall policy mix has however not changed significantly since the launch of the Marshall Plan 2.Green in 2009. Since the launch of Creative Wallonia in 2010, it is considered that innovation is not only based on new technologies - but can take place anywhere in society - and that creativity should be further promoted within all regional stakeholders groups. Living Labs are being developed and should support user-driven innovation, but there is still a role for the public sector to play in promoting innovation more widely, for instance through public procurement for innovation, which is so far inexistent.

The OECD review of the regional innovation system highlights that the integrated research strategy for 2011-2015 and Creative Wallonia have been adopted in the same timeframe and serve different objectives that could have been better connected. This dichotomy would demonstrate the difficulty to integrate technological and non-technological innovation in a common strategy for the Walloon region.

An overview of existing support measures in Wallonia can be found in the table below.

[16] It is the contribution of the Wallonia-Brussels Federation to the implementation of the European Charter for Researchers, the European Code of Conduct, the European Commission Partnership for Researchers, the recommendations of the Helsinki Group on Women and Science and the human resources strategy of the "Innovation Union" of the European Union.

Table 3 Existing regional innovation support measures

Title	Duration	Policy priorities	Budget	Organisation	More info
Competitiveness poles	2005 - No fixed end date	5.1 Cluster development 2.1 R&D cooperation projects between academy and industry 3.2. Training and life-long learning of researchers and any other personnel involved in innovation	€280m (2006-2010) €388m (2010-2014)	DGO6	RIM Link
Clusters	2001 - No fixed end date	5.1 Cluster development	Degressive support over three years with max of €160k the 1st year/cluster. 8 clusters in 2013: max investment of €1,28m	DGO6	RIM Link
FIRST Spin-off	1999 - No fixed end date	4.3 Fostering start ups and Gazelles 2.2 Mobility between academia and industry	€26,377,190 over 2003-2012 (€3,018,085 in 2012)	DGO6	RIM Link
FIRST Enterprise	1993 - No fixed end date	2.2 Mobility between academia and industry 4.1 Direct funding to business R&D and innovation 2.4 Demonstration projects, prototypes and proofs of concept	€37,6m over 1993-2012	DGO6	RIM Link
Mobilising programmes	1994 - No fixed end date	2.1 R&D cooperation projects between academia and industry 1.2 Competitive funding of research	Approximately €200m over 2002-2013	DGO6	RIM Link
OP IN	2012 - No fixed end date	4.2. Organisational, process and other non-R&D innovation	€640,000 (2012) n/a for 2013	SPW/ DGO6	RIM Link
Creative People	2013 - No fixed end date	5.3 Innovation awareness-raising 6.1 User-driven innovation initiatives	€280,000 (2013)	ASE	RIM Link
NEST'up	2012 - No fixed end date	4.3 Fostering start-ups and gazelles 5.4 Innovation management and advisory services 5.3 Innovation awareness-raising	€200,000 (2012) n/a for 2013	DGO6/ association Fostering Ideas	RIM Link
Prototyping	2012 - No fixed end date	2.4. Demonstration projects, proto-types and proofs of concepts	€35.5m (2012)	DGO6	RIM Link
Boost'up Creative industries	2011 - No fixed end date	4.7 Design for innovation 4.3 Fostering start-ups and gazelles	€430 000 per year since 2011	Wallonie Design	RIM Link
Germaine Tillion – social innovation	2013 - No fixed end date	7.2 Social innovation initiatives 1.2 Competitive funding of research 2.1 R&D cooperation projects between academy and industry	€5m (2013)	DGO6	RIM Link
Public-Private partnerships for breakthrough innovation	2004 - No fixed end date	2.1 R&D cooperation projects between academy and industry	€46m over 2004-2012 (public support)	DGO6	DGO6 link
Venture capital for spin-offs, spin-outs and innovative	2003 - No fixed end date	5.5 Seed and early-stage capital vehicles, business angel networks 4.3 Fostering start-ups and gazelles 5.4 Innovation management and advisory services	€130m over 2006-2014: additional regional investment via SOWALFIN and the Invests, i.e.	SOWALFIN	SOWALFIN

Title	Duration	Policy priorities	Budget	Organisation	More info
companies			app. €16m/year. Total funds mobilised several times larger.		
Grants for using the services of a consultant to integrate e-business in SMEs (RENTIC Premium)	2002 - No fixed end date	4.2. Organisational, process and other non-R&D innovation 5.4 Innovation management and advisory services	€1,133,186 (2012)	DGO6 and AWT	AWT
Feasibility study for software	1991 - No fixed end date	2.4. Demonstration projects, proto-types and proofs of concepts 4.2. Organisational, process and other non-R&D innovation	App. €9.9m over 1991-2012	DGO6	DGO6
Grant for the creation of an e-business website	2002 - No fixed end date	4.2. Organisational, process and other non-R&D innovation	€1,572,504 (2012)	DGO6 and AWT	AWT
Technical feasibility study	1994 - No fixed end date	2.1 R&D cooperation projects between academy and industry 5.4 Innovation management and advisory services	App. €25,6m over the period 1991-2012	DGO6	DGO6 link
Innovation grant	2007 - No fixed end date	4.2. Organisational, process and other non-R&D innovation 4.1 Direct funding to business R&D and innovation 4.7 Design for innovation	€248,211 (2012)	DGO6 and ASE	RIM Link
R&D project in experimental development	1991 - No fixed end date	4.1 Direct funding to business R&D and innovation 2.1 R&D cooperation projects between academy and industry	App. €850m over 1991 - 2012 (€40m on average per year)	DGO6	DGO6 link
Industrial research subsidy	1994 - No fixed end date	4.1 Direct funding to business R&D and innovation 2.1 R&D cooperation projects between academy and industry	App. €270m for the period 1991-2012	DGO6	DGO6 link
Technical-marketing studies	1994 - No fixed end date	5.4 Innovation management and advisory services 4.3 Fostering start-ups and gazelles	App. €4,7m for the period 1994-2012	DGO6	DGO6 link
Subsidy for patent registration and extension	2003 - No fixed end date	4.4. IPR protection and exploitation	€8.5m for the period 2004-2012	DGO6	RIM Link
Pre-activity grant	2001 - No fixed end date	4.3 Fostering start-ups and gazelles 5.4 Innovation management and advisory services	€1,084,426 (2012)	DGO6 and ASE	ASE
Technological advisors	1994 - No fixed end date	5.4 Innovation management and advisory services 2.2.2 Knowledge Transfer structures between academia and industry 4.4. IPR protection and exploitation	€61 934 274 for the period 2001-2011. No call for project in 2012, 1 call in 2013.	DGO6	DGO6 link
Novallia	2009 - No fixed end date	5.5 Seed and early-stage capital vehicles, business angel networks 4.3 Fostering start-ups and gazelles	€6,833,900 (2012)	SOWAL FIN	Novallia

3.2 Appraisal of Regional Innovation Policies

The competences of the federal and federated entities are clearly set to ensure a complementarity of interventions, however, in practice each entity is free to implement its own initiatives in its fields of competences. The federal role is limited to tax measures, intellectual property law, corporate taxation measures (R&D tax credit), employment legislation and social security. As of July 2014, a further regionalisation of competences will take place and the role of the federal level will be even more reduced. Given the fragmentation of policy mandates, synergies at intraregional level tend to be moderately high. Education policy is to a large extent aligned with research, and – to a lesser extent – with innovation policy.

As already discussed, over the last decade, Wallonia has focussed its efforts on structuring and developing major thematically, sectorally or technologically specialised R&D and innovation 'clusters' through competitiveness poles, clusters and targeted research programmes. This goes along with the recent clear willingness to streamline innovation policy support (e.g creation of the Enterprise and Innovation Agency in 2014, as well as the WALTECH umbrella organisation, which is coordinating the applied research institutes accredited by the region) and clarify the higher education landscape (creation of the Academy for Higher Education and Research in 2014). This strategy is in line with the need to better orientate and focus the limited amounts of public funding available in domains with a high potential for the region. However the regional innovation policy mix remains essentially based on grants (or reimbursable loans) for individual firms to undertake R&D aside from the federal R&D tax measures. At the current time, there is limited recent evaluation evidence on the effectiveness of all the measures in place. Evaluation is indeed a recent practice in Wallonia; most of evaluations were essentially carried out in the framework of Structural Funds intervention until the Marshall Plan 2. Green[17].

Noticeably, Wallonia has invited the OECD to review its regional innovation system in 2011. The final report was publicly presented at the start of 2013 (OECD, 2013). According to the OECD assessment, better articulation and coordination of policies (regionally but also with other Belgian entities) and better integration of non-technological aspects of innovation are key to economic development in Wallonia. Among other points, the report highlights that the modified policy mix emerging from the Marshall Plan raises questions of efficiency of implementation, which have to do with the proliferation of support measures and a degree of institutional inertia. Innovation stakeholders in Wallonia are faced with a set of instruments and players responding to their own visions and objectives and to different policies; they have accumulated over time with little attention to their overall synergy.

The key recommendations from the OECD report are the following:

- Increase the allocations for research and innovation within the budgets of the Region and the French-speaking Community;
- Structure the policy around the twin objectives of broadening and deepening innovation;
- Break down barriers in the governance of innovation policy and distinguish the functions of policy orientation, programming and execution;
- Improve the policy mix and add instruments that target innovation demand; and
- Reinforce strategic intelligence throughout the policy cycle, through

[17] The first Marshall Plan had been evaluated (assessment of the impact and efficiency of the implemented measures) at the beginning of 2009 by the IWEPS whereas the monitoring of the measures implemented during the Marshall Plan had been carried out by 'special delegates' of the government. The timeframe for this exercise has nonetheless been rather reduced (study commissioned in November 2008 and completed in March 2009).

- the establishment of a "Research and Innovation Observatory" for analysing and monitoring the regional situation, with feedback from beneficiaries and ongoing international benchmarking and
- the generalisation and professionalisation of independent evaluations.

In 2012, an evaluation was completed on the actions co-financed by the European Fund for Regional Development to develop and exploit Wallonia's innovation potential over 2007-2013 (ADE, 2012). The study mainly focused on the instruments dealing with the "development of human capital, knowledge, know-how and research", which target SMEs. The evaluation highlighted that an important qualitative step forward has been made compared to the previous 2000-2006 period. Some instruments of direct support to companies proved successful since they were well adapted to the needs and reality of SMEs. This is for example the case of Novallia and the Technology Vouchers, which offer the SMEs a simplified administrative management and a wide range of financial support adapted to the needs at an advanced stage of the process. However, some instruments like Aquitech, Stimule and First Enterprise Doctor did not encounter such a success, because they were not in line with SMEs' needs. They mainly provided support for industrial research activities, whereas SMEs needed more assistance at the experimental development stage. There was a lack of coherence between the implementation of the instruments of this intervention area of the ERDF programme and the projects of the Marshall Plan.

The main recommendations from the evaluators for the next programming period as regards innovation measures to be implemented within the Structural Funds framework can be summarised as follows:

- Prioritise the objectives, clarify the intervention logic, and ensure effectiveness and efficiency of implemented instruments from the start: focus the programme on the needs of the targeted SMEs (with the stimulation of innovation as a priority);.
- Accelerate knowledge transfer from research centres to SMEs (by financially sustaining the effective involvement of SMEs concerned by the research projects); and
- Set up tools to optimise the effectiveness and efficiency of the programme

The Marshall Plan 2. Green innovated by including as one of its measures to perform a set of 13 thematic evaluations of the Plan that will feed into its global evaluation, demonstrating an increased attention to efficiency and efficacy of public action. These evaluations were entrusted to the IWEPS (Walloon Institute for Evaluation, Prospective and Statistics). To those thematic evaluations belong the one of the mobilising programmes completed in 2013, the one of the competitiveness poles (2014) and the one on the financing of innovation (to be completed in March 2014). The creation of an Institute for Technology Assessment within the Walloon Parliament in 2011 is also a good indicator of the recent political willingness to have an evidence based research and innovation policy mix and system.

Launched in the mid-1990s, the mobilising programmes were evaluated for the first time in 2013 (IWEPS, 2013). The objectives of this scheme have evolved over time with a higher attention given to the socio-economic exploitation of research results but also to the environment. These changes of objectives have impacted the implementation modalities of the scheme (incl. targets, types of partnerships). The evaluation highlighted that a clear tension exists between the different objectives of the measure, in particular reinforcing the scientific knowledge and technical competences of the Walloon research world in the short term, while ensuring in the medium term that this scientific potential is exploited within the region. It comes out that the supported projects have allowed developing partnerships and stimulating communication between public and private partners. Most of the results achieved are essentially of a scientific nature: knowledge development, cross-disciplinary synergies, scientific publications and (for companies) integration into an open innovation process. The IWEPS has developed a set of recommendations including:

- Ensure a continuity of the objectives pursued by the programme over time;
- Better address the issue of economic exploitation of research results by using a technological maturity scale (measure level of maturity at the beginning of the project and set relevant target depending on the sector);
- Better define the question of environmental impact in line with European standards;
- Ensure the continuation of project funding at the end of the promising projects in line with the timeframe set to the exploitation of results, this in order to overcome the valley of death phase.

In the framework of the evaluation of the Marshall Plan 2.Green, a thematic evaluation of the competitiveness poles policy was completed in January 2014 by Technopolis Group in partnership with Erdyn. Key recommendations of that evaluation are the following:

- *Continue and deepen the competitiveness poles policy*

The poles should become the official backbone of the Walloon industrial and innovation policy. Their role as facilitator and integrator within the regional economy should be confirmed by better communicating on their results, actions and services to member and non-members. The existing results at the international level should be exploited and their integration into international partnerships and networks should be increased. The renewal of the governance structures should be ensured and combine stability and turnover of members.

- *Ensure the future development of the poles at the legal and financial level*

The poles should be provided with a legal framework identifying their missions and requesting a regular (every five years) update of their strategies. The operational cells should also be financed on a multiannual base (five years) with an evaluation at the end of each cycle. Finally, the poles should progressively increase their self-funding in order to reach 50% within 3-4 years.

- *Implement a more strategic management of the policy, with a more efficient monitoring system*

The competitiveness poles should be more integrated with the others Walloon policies. In particular the public procurement for innovation should be developed in the region based on the competences of the poles. The inter-poles cooperation should also be enhanced (sharing good practices, structuring thematic areas of common interest). The policy should be connected to the regional Smart Specialisation Strategy (S3). The monitoring system should be reinforced (dedicated system, better circulation of information, adapted progressive indicator system based on the level of technological maturity of the project, follow-up at project closure, etc.) and part of the projects' funding should be conditional to the provision of monitoring information by the poles.

- *Develop the portfolio of activities related to the economic exploitation of results from collaborative R&D projects*

The issue of economic exploitation should be thought upstream of the projects (market studies, first prospects and clients, etc.). The export, training, investments, and infrastructures dimensions of the projects should be directly integrated into the R&D projects proposals (rather than dissociating projects per type of support) and implemented only upon approval from the international jury, depending on the needs and progress of the project. Finally, the competitiveness poles must become the focal point for the project holders in order to reinforce their legitimacy to intervene during the project's implementation. The activities of the poles should be developed in relation to the regional stakeholders involved in the economic exploitation (incubators, KTO, financers).

- *Integrate the training actions into more strategic and prospective reflections*

Strategic and prospective exercises should be performed to evaluate the evolutions of jobs and competences in companies in order to define needs in the poles' thematic areas on a five years time horizon. On this basis, poles should work together with training providers to adapt the existing offer or create new trainings if necessary. The training projects should then be strategically steered thanks to the monitoring of a set of relevant indicators.

- *Ensure a better coherence of the competitiveness poles policy with the other components of the regional innovation system*

The needs of the poles' members should be better connected to the services offered by the regional network (in particular the new AEI). The regional research and innovation support system should be re-organised around the poles and the thematic approach should be reinforced within existing structures (as did the AWEX). In this respect, the poles policy objectives should be clarified compared to the clusters policy, and the business clusters active in areas similar to the poles should be integrated within the poles. The overall objective here is to maximise existing synergies and ensure the visibility of the system.

3.3 Good practice case

Following the examples of similar initiatives implemented in other countries and regions, the Walloon region has launched since 2005 **competitiveness poles** that have since then become the backbone of the regional economic development policy. While the Walloon clusters initiated in 2001 address mainly businesses, competitiveness poles aim at creating a critical mass in the Walloon innovation system by joining efforts of different actors.

Initially five, there are six competitiveness poles in Wallonia since 2011: 1) life sciences; 2) agro-industry; 3) transport-logistics; 4) mechanical engineering; 5) aeronautics/space; 6) environmental technologies (created in 2011). In the terms of the call for projects launched by the Walloon Government at the end of 2005 the poles should be:

- Based on a close partnership between enterprises, training bodies and research units;
- Be financed by private and public funds;
- Target development priorities with medium-long term potential;
- Have the potential for growth leading to critical mass and the potential for visibility and recognition at an international level;
- Include an international dimension; and
- Contribute to the development of economic activities in Wallonia.

This policy was initially developed using a top-down approach, priority sectors being identified on a scientific basis through an analysis of regional potentials and development perspectives. A call for interest was then launched by the Government, inviting proposals including a mix of concrete research and contextual planning linking the research to an overall pole strategy.

Only one pole could be financed in each of the priority domains. A jury of international experts evaluated the proposals submitted and the Government selected the competitiveness poles. A total budget of €280m was allocated to the five competitiveness poles over 2006-2010 and €388m to the six poles for the period 2010-2014, i.e approximately €77.6m per year. The current budget includes:

- Research and development support: funding of industrial basic research, applied research and development[18];
- Aids for financing specific training actions necessary for the development of the competitiveness clusters (this is a specificity of the Walloon clusters in comparison to the French ones);
- Support for exports and attraction of foreign investments: hiring of a person responsible for export in each pole and setting up of an annual export plan and prospecting of investors on a sectoral basis;
- Investment subsidies allocated to companies; and
- Investments in infrastructures and equipment.

The Government is launching, on a regular basis, calls for projects directed to the poles. Projects first undergo an internal review within the pole and then are submitted to the international jury for a final "go-no go" decision. As of 2013, 241 projects have been approved under the framework of the competitiveness poles policy after the first eight calls for a total amount of €612m.

In the framework of the evaluation of the Marshall Plan 2.Green, a thematic evaluation of the competitiveness poles policy was completed in January 2014 by Technopolis Group in partnership with Erdyn. The evaluation emphasises that the competitiveness poles policy have become a major tool of the regional industrial policy and are in line with the regional economic development strategy which is focused on the integration of stakeholders and measures around a set of lead areas. Nonetheless, the evaluation also underlines that an effort should still be done to better organise and integrate the competitiveness poles to the regional economic system. There are not yet sufficient linkages between the economic/cluster policies and the Walloon sectoral policies (e.g agriculture, environment, health). The poles policy suffers from the lack of clarity/visibility of the regional business and research support system. The competitiveness poles have in particular also a key role to play within the framework of the regional Smart Specialisation Strategy (S3).

Looking closer at the way the measure was implemented, the evaluation highlights that this has overall functioned well and allowed the selection of good quality projects. However, it was regretted that the different implementing entities that have been set up act more as discussions circles rather than committees providing a strategic steering to the policy. An extensive monitoring system has also been set up to monitor the outcomes and impacts of the poles, but the data transmission has proved to be relatively inefficient because of the wide range of actors involved in the implementation and the lack of incentives for project leaders to provide accurate information. The administrative burdens and the length of the agreement procedure were important limits to the further development and good implementation of projects. Given these difficulties, a set of procedures was launched to simplify the administrative process. The launch of calls for projects three times per year as of 2014 (instead of one) should also help reduce the length of the procedure..

Overall, the competitiveness poles' strategic positioning appears relevant since they respond to Walloon and domain-specific challenges. However the strategies are not always clearly defined and structured around clear objectives and a set of operational actions. It appears important to better anticipate the sectoral evolutions and to integrate them into a regular strategy update. Interestingly enough, the competitiveness poles initiated a positive cross-poles collaboration dynamic that

[18] Looking at the types of actions implemented, the unequal prevalence of R&D projects (83% of the total funding decisions) and training actions (13%) over the other types of support raises questions on the relevance of the intervention tools. The very low use of investment projects can be explained by the too low level of financial incentives provided within the poles for those investments, the lack of legibility for the infrastructure actions, and, above all, the few number of projects reaching the commercialisation stage.

fosters synergies between the different areas. They also well integrate the different stakeholders of their specific domains within the governance structures. In particular, SMEs are generally well involved in the poles, although their participation in R&D collaborative projects remains fairly low. In addition a low turnover of projects' participants is noted. The lack of information and time to dedicate to the poles would be an important barrier for an increased participation of SMEs.

The evaluation put a spotlight on the role played by the poles as facilitator and integrator. The core of their activity is coherent with the objectives of the policy such as supporting the emergence and setting-up of collaborative projects, support to international actions, and coordination. Nonetheless, they are less involved in the projects implementation phase, because notably of the lack of a clear definition of their role, and thus of their authority to intervene, which is an impediment to the full effectiveness of the policy. The poles invest very little time in activities related to the exploitation of research results, technology transfer and projects' monitoring, which impact their capacity to generate business growth and jobs. The coordination cells of the competitiveness poles have a high and increasing level of public financing (83% of the total financial and in-kind contributions), which is a source of concern given the EU state-aid regulations.

In summary, the identified impacts and outcomes of the competitiveness poles policy so far are as follows:

- The relations between academics and major industries/regional SMEs have been increased, based on a capitalisation of competences. It led to the creation of thematic economic systems with a regional and international visibility. Most of the cooperations are maintained at the end of the projects. The impacts for the participating enterprises range from no impact, to business growth (increased turnover, value-added, staff), to the creation of a spin-off, or joint ventures to exploit the research results. The reinforcement of research capacity and competences provided partners with increased credibility leading to new partnerships or projects. The introduction of research activities within some SMEs also led to a better structuring of their industrial research activity, better management of their R&D projects and to an increased openness to collaboration. Overall, the 117 R&D projects that have been completed have led to 104 international collaboration contracts, 202 patent applications, 57 patents awarded, 13 sold licences. Research organisations have improved their scientific and technological expertise and their visibility. These new competences translate to new patents, publications or signatures of industrial collaboration contracts. The industrial projects also enabled the partners to extend their activities towards more applied research, to acquire high-tech equipment, to conduct validation tests, to finance personnel over a long period, and to train students to industrial needs.
- As regards the training projects, difficulties have been encountered to reach the main target audiences (firms' employees).. Many of the first training projects were rather opportunistic, launched without performing an analysis of the existing offer nor a demonstration of their added-value for the pole and for companies. However the persons trained reinforced their industrial and technological expertise as well as their soft skills. The increased connections between academics and enterprises also contributed to improve the training offer in higher education institutions by developing new teaching tools and new collaborative approaches between the operators. Finally, several trainings have been integrated into existing degrees.
- Results achieved at the international level are noteworthy, where poles have joined international networks and partnerships. The AWEX actions have increased the visibility of Wallonia on a set of domains at the international scale. The 113 projects managed by AWEX sectoral experts within the framework of the poles policy attracted €660m foreign investments.

- Even if many projects did not lead to an economic exploitation so far, some noteworthy impacts can be noted: the directors of the poles declare that the 117 R&D projects that are on-going or concluded have lead to creation or maintaining of 5,423 jobs and the creation of 19 enterprises. It is however difficult to conclude on the economic impacts of the policy as many projects are still underway and impacts need time to emerge.

To conclude, the sustainability of the results achieved by the competitiveness poles policy will depend on three key issues: the solutions that will be developed at the level of the economic exploitation of research results; the necessary reflection on the financing of the coordination cells within the EU State-aid regulations; and the capacity of the scheme to reinforce coordination between policy stakeholders and the regional ecosystem.

3.4 Towards Smart Specialisation Policies

The draft smart specialisation strategy (S3) for Wallonia was presented in May 2012 at a peer review workshop organised by the S3 Platform set up by the Joint Research Centre of the European Commission[19]. According to the regional documents on the development of the Walloon S3[20], the basic principles of such a strategy were already integrated in the regional economic development strategy developed since the early 2000's and the "Walloon contract for the future", which was the first integrated regional development strategy, involving the coordination of all Walloon innovation stakeholders.

One of the key evolutions in the innovation policy over the last decade is targeting regional support towards a set of sectors demonstrating a high potential for the Walloon region, in particular through the competitiveness poles (see previous section) and cluster policy, but also through targeted research programmes, specific training and internationalisation support. Since 2009, a specific focus on the 'green' dimension has been also integrated into all policies.

Launched in 2001, the objective of the clustering policy is to develop business networks in specific domains and research organisations, in order to develop a cooperation framework and ensure a stronger economic development.. The first stage of the cluster policy (2001-2006) was experimental. In 2007, on the basis on the evaluation of the pilot phase, a cluster Decree was adopted setting the concrete modalities of implementing this policy on a long term perspective. The policy is developed using a bottom-up approach. Demands coming from existing business networks are spontaneous. They are the initiators and drivers of their own development (strategy and actions). The regional authority is here acting as a catalyst providing a funding over a-three year period to cover the animation costs. A specific support may also be available for international and inter-cluster cooperation.

Building on the clustering policy experience implemented since 2001 and EU good practices, the region requested in 2005 a university professor (Capron, 2005) to undertake a study to identify potential niches for specialisation that would enable the region to reach "critical masses". Altogether some 36 indicators were collected and classified into eight main categories: Economic basis (1) and its evolution (2), Technological basis (3) and its evolution (4), Scientific basis (5) and its evolution (6), the state of the redeployment process (7) and the prospects for the development of the

[19] The S3 Platform assists EU countries and regions to develop, implement and review their Research and Innovation Strategies for Smart Specialisation (RIS3). Established in 2011 following the Communication 'Regional Policy contributing to smart growth in Europe 2020', the role of the S3 Platform is to provide information, methodologies, expertise and advice to national and regional policy makers, as well as promote mutual learning, trans-national co-operation and contribute to academic debates around the concept of smart specialisation. The S3 Platform is hosted by the Institute for Prospective Technological Studies (IPTS) in Seville, part of the European Commission's Joint Research Centre.

[20] See Public Service of Wallonia – Economic Policy Department (2012), Towards a RIS 3 Strategy for Wallonia - Background document, S3 Platform Workshop, Seville, 3 May 2012

strategic assets (8). Against this analysis, a set of sectors in which the Region had a high innovative potential were identified and regional stakeholders were invited to submit proposals for the development of competitiveness poles in these areas involving enterprises, research organisations and training centres:

- Life Sciences and health
- Agri-Food Industry
- Aeronautics and space Industry
- Mechanical Engineering
- Transport & Logistics

A complementary study was performed in 2009 in order to develop a "green Pole". The specific specialisation areas of sustainable chemistry and materials were then identified as having the most potential for the region. Six competitiveness poles are in operation at the moment, in six distinct areas of specialisation. The calls for projects are launched by the Government but the strategy of competitiveness poles (niches markets and technology fields) is defined bottom-up.

As the poles have been selected on the basis of their economic and technological weight in the regional economy, but also on the basis of their development strategies in their thematic area, in which they possess competitive advantages, the smart specialisation strategy of Wallonia is today directly linked to the competitiveness poles and cluster policy. According to regional stakeholders, the development of the regional smart specialisation strategy is also based on several other studies such as the bi-annual publications of the Federal Planning Bureau and its set of (Eurostat) indicators on the Walloon innovation system, the OECD peer review study (2013) and an industrial prospective analysis on industrial value chains (IDEA, 2013).

From the evaluation of the Walloon competitiveness clusters (2014), it appears that the poles have indeed a key role to play in the implementation of the Walloon S3 strategy, i.e. by offering platforms for cross-sectoral collaborations, implementing thematic strategies in line with societal challenges, exploring co-investment possibilities. The implementation of the S3 can indeed allow the region to gain a better cross-border connectivity (regionally and internationally) and cooperation along the value chain allowing reaching critical masses and gaining further knowledge.

Figure 7 Walloon smart specialisation strategy

Source: Walloon Public Service (2014)

Within the Walloon Research strategy for 2011-2015, common priorities of the region and the Wallonia-Brussels Federation have also been identified. These priorities

encompass and aim at tackling major societal challenges: Sustainable Development; Renewable energies; Quality and length of life; Health; and Key technology domains.

The reflection process on the regional smart specialisation strategy is still on-going at the time of writing this report. The current process aims at better integrating and articulating the different policies implemented in the region (Research Strategy, Creative Wallonia), notably to better stimulate innovation in a broader sense, adopt an approach taking more into account the existence of global value chains (e.g better consideration of services), and increase the international orientation of the Walloon competitiveness poles policy (Horizon 2020, priority sectors, key enabling technologies and societal challenges, etc.). Most of the regional support measures are expected to remain generic in their set-up but offering a thematic focus and paying a particular attention to resource efficiency and circular economy. Interestingly one objective of the Marshall Plan 2022 currently in preparation is to d*evelop an explicit policy of research, innovation and creativity to guide stakeholders and research institutions towards a smart and prospective specialisation consistent with the priorities of the European Union*.

3.5 Possible Future Orientations and Opportunities

Based on the different analysis reports published recently on the Walloon innovation system or measures (see section 3.2), a set of key future policy orientations and opportunities can be identified.

- **Further streamline regional innovation policy and ensure increased institutional cooperation**

The (sub-)regional structures supporting innovation should be further streamlined, as started with the creation of the Enterprise and Innovation Agency in 2014. The OECD review (2012) is even suggesting breaking down barriers in the governance of innovation policy and distinguishing the functions of policy orientation (possibly through an inter-ministerial entity, which would encourage synergies with other regions, communities and at the external level), programming (possibly through performance contracts) and policy execution.

The regional research and innovation support system should also be re-organised around the competitiveness poles, whereas the thematic approach should be reinforced within existing research and innovation support structures. The overall objective here is to maximise existing synergies and improve the coherence of the system not only for the regional stakeholders but also outside Wallonia.

- **Take opportunity of the new policy cycle and of the new Structural Funds programming period to focus research and innovation support on areas with the highest innovation potential**

The public allocations for research and innovation have to be increased while encouraging more companies to get engaged in innovation. This has to be done in coherence with the regional smart specialisation strategy. The region needs to better orientate and focus the limited amounts of public funding available in domains with a high potential for the region, thus creating a critical mass, while offering a higher visibility not only outside Wallonia but also for the local stakeholders, in particular SMEs.

The Marshall Plan has introduced a series of support measures with different goals and objectives. Even if the regional innovation policy mix has evolved over recent years, it remains essentially based on grants (or reimbursable loans) for individual firms to undertake R&D aside from the federal R&D tax measures.

A stronger emphasis could be placed on instruments to facilitate the access to external sources of funding (risk capital) with the view of encouraging the creation and development of innovative companies. There is also a need to ensure that regional research and innovation stakeholders can receive an efficient support at all stages from basic research to commercialisation without facing gaps in funding nor delays.

The research and innovation policy measures should thus be streamlined and adapted to the needs of the regional economic structure. The approach of innovation (incl. non-technological innovation and demand-side innovation) should be further widened to reach a broader audience (SME, individuals, public sector), while focussing the support on key domains for regional development.

In particular, the public procurement for innovation should be developed in the region based on the competences of the competitiveness poles, which should become the official backbone of the Walloon industrial and innovation policy. Their role as facilitator and integrator should be confirmed by better communicating on their results, actions and services to member and non-members. The existing results at the international level should be exploited and their integration into international partnerships and networks should be increased.

- **Develop more strategic and prospective exercises on the evolutions of jobs and competences in companies within the thematic areas of the Walloon competitiveness poles**

Strategic and prospective exercises should be performed to evaluate the evolutions of jobs and competences in companies in order to define needs in the poles' thematic areas on a five years time horizon. On this basis, poles should work together with training providers to adapt the existing offer or create new trainings if necessary. The training projects should then be strategically steered thanks to the monitoring of a set of relevant indicators.

- **Reinforce strategic intelligence throughout the policy cycle**

Although evaluation practices are evolving, an important number of support measures has not been subject to external evaluation. A wide-ranging evaluation and review of the whole innovation support system would be recommended, in order to focus regional support on initiatives with the highest potential to contribute to raising the intensity of industrial R&D and innovation (including service sector and non-technological forms of innovation). This also relates to the setting-up of efficient monitoring systems for all policies implemented.

Appendix A Bibliography

1. ADE (2012), Evaluation of actions co-financed by the ERDF to develop and exploit Wallonia's innovation potential in the framework of the "Convergence" and "Regional Competitiveness and Growth" Operational Programmes (OPs) 2007-2013
2. Boekholt, P., & Gheorgiu, L., (Rapporteurs) (2011), 2011 Policy Mix Peer Review Belgium Final Report.
3. Bruno, N., Giarracca F., Knecht F., Lacave M., Reid A., Zaparucha E. (2014), Evaluation des résultats atteints par la politique des pôles de compétitivité wallons – Rapport final, Etude menée par Technopolis Group et Erdyn pour le compte de l'IWEPS
4. Bruno, N., Van Til, J. (2010), ERAWATCH Country Reports 2010: Belgium. ERAWATCH Network – Technopolis Group, Institute for Prospective Technological Studies
5. Bruno, N., Van Til, J. (2011), Mini Country Report: Belgium, Thematic Report 2011 under Specific Contract for the Integration of INNO Policy TrendChart (European TrendChart on innovation) with ERAWATCH (2011-2012), European Commission, DG Enterprise & Industry
6. Bureau Fédéral du Plan (2012): Le système d'innovation en Wallonie.
7. Bureau Fédéral du Plan, Tableau de Bord de la Recherche et de l'innovation en Wallonie, http://indicators.plan.be/
8. Conseil de la Politique Scientifique (2012), Evaluation de la politique scientifique de la Région Wallonne et de la Communauté Française, années 2010 et 2011
9. Gouvernement de la Fédération Wallonie-Bruxelles (2009), Déclaration de politique communautaire 2009-2014
10. Gouvernements de la Fédération Wallonie-Bruxelles et de la Wallonie (2009), Viser l'excellence : Plan Marshall 2.Vert, 2009
11. Gouvernements de la Fédération Wallonie-Bruxelles et de la Wallonie (2011), Partenariat Wallonie-Bruxelles pour les chercheurs et les chercheuses
12. Gouvernements de la Fédération Wallonie-Bruxelles et de la Wallonie (2011), Stratégie Recherche 2011-2015 – Vers une politique intégrée de la recherche
13. Gouvernement de la Région Wallonne (2009), Déclaration de politique régionale 2009-2014
14. Institut Wallon de l'Evaluation, de la Prospective et de la Statistique (2013), Les Chiffres Clés de la Wallonie, n°13
15. Institut Wallon de l'Evaluation, de la Prospective et de la Statistique (2013), Evaluation du Plan Marshall 2.Vert, Evaluation thématique n°2: programmes mobilisateurs, Rapport final
16. Public Service of Wallonia – Economic Policy Department (2012), Towards a RIS 3 Strategy for Wallonia - Background document, S3 Platform Workshop, Seville, 3 May 2012
17. RTBF (2013), Interview de Jean-Claude Marcourt "Creative Wallonia: qui sème la créativité récolte l'innovation", 15/04/2013, http://www.rtbf.be/info/belgique/detail_creative-wallonia-jean-claude-marcourt-veut-creer-les-conditions-favorables-pour-les-entreprises-innovantes?id=7970530

18. Service Public de Wallonie (2011), Les crédits budgétaires affectés au soutien, à la valorisation et à la promotion de la R&D en Wallonie pour l'année budgétaire 2011, Juin 2011
19. Service Public de Wallonie(2012), DGO6, Rapport annuel 2012
20. Union Wallonne des Entreprises (2013), L'entreprise, je veux savoir!, Edition 2013
21. Website of Creative Wallonia, http://www.creativewallonia.be
22. Website of the Marshall Plan 2.Green, http://planmarshall2vert.wallonie.be
23. Ziarko W., Reid A., Bruno N. (Eds.) (2010): Belgian Report on Science, Technology and Innovation 2010, BELSPO

Appendix B Stakeholders consulted

1. Vincent Lepage, Director, Competitiveness and Innovation Department, Directorate for Economic Policy, Public Service of Wallonia (date of interview: 10 October 2013).
2. Florence Hennart, Attachée, Competitiveness and Innovation Department, Directorate for Economic Policy, Public Service of Wallonia (date of interview: 10 October 2013).
3. Dominique Graitson, Secretary of the Science Policy Council, Economic and Social Committee of Wallonia (date of interview 16 October 2013).
4. Didier Paquot, Director for Economy-R&D and European Affairs, Walloon Business Association (Union Wallonne des Entreprises) (date of interview 21 October 2013).

Appendix C Additional data

Table 4 Types of innovation – Enterprises with technological innovations

Data from the Community Innovation Survey	Wallonia			Belgium		
	2006	2008	2010	2006	2008	2010
Enterprises engaged in acquisition of machinery, equipment and software						
Manufacturing						
10-49 employees	82.5	77.2	67.1	80.2	71.7	71.3
50-249 employees	83.1	73.1	76.4	78.3	72.7	69.4
250 or more employees	67	97	87.6	75.3	78.2	75.9
All enterprises	81.3	77.3	71.8	79.4	72.5	71.2
Services						
10-49 employees	76.9	56.9	57.3	65.8	56.9	46.6
50-249 employees	56.4	73	62.9	57.5	63.6	67.0
250 or more employees	92.3	46.9	84.6	76.5	59.6	62.1
All enterprises	73.5	58.4	60.3	64.8	58.2	52.0
Total						
10-49 employees	--	67.1	63.1	72.7	63.2	57.5
50-249 employees	--	72.3	71.9	69.7	68.9	67.9
250 or more employees	--	84	87.4	75.2	70.8	70.8
All enterprises	78.6	68.7	67.6	72.3	64.9	61.0
Enterprises engaged in other external knowledge						
Manufacturing						
10-49 employees	20.8	15	26.0	21.1	19.5	18.3
50-249 employees	25.6	14.6	22.7	23.6	24.9	24.0
250 or more employees	28.4	4	39.2	34.1	34.5	32.5
All enterprises	22.4	14.3	26.4	22.7	22.1	21.1
Services						
10-49 employees	24.1	14.1	23.2	23.5	19.8	16.5
50-249 employees	21	15.8	30.5	27.8	25.6	28.2
250 or more employees	92.3	46.9	30.8	35.9	43.1	44.1
All enterprises	25.3	15	26.0	24.8	21.8	20.5
Total						
10-49 employees	--	14.6	24.0	22.2	19.8	17.1
50-249 employees	--	14.6	25.7	25.4	25.5	25.6
250 or more employees	--	15.2	39.3	34.7	38.5	36.9
All enterprises	23	14.6	25.7	23.7	22.1	20.6
Enterprises engaged in extramural R&D						
Manufacturing						
10-49 employees	28.4	18	33.7	30.1	25.3	26.3

Data from the Community Innovation Survey	Wallonia			Belgium		
	2006	2008	2010	2006	2008	2010
50-249 employees	41.5	51.6	61.1	39.8	46.2	42.5
250 or more employees	80.2	61	63.9	75	68.5	65.1
All enterprises	35.3	28.3	44.5	35.9	34.1	34.2
Services						
10-49 employees	35.9	23	30.7	26.9	32.4	24.4
50-249 employees	28.6	48.2	47.4	37.3	36.1	41.8
250 or more employees	76.9	44.5	15.4	47.7	46.4	39.1
All enterprises	35.6	26.2	36.0	29.6	33.6	29.1
Total						
10-49 employees	--	21.4	32.0	28.5	29.7	25.3
50-249 employees	--	52	55.7	38.9	42.8	41.7
250 or more employees	--	56.7	56.9	65.7	60.8	55.8
All enterprises	35.3	28.2	41.0	32.9	34.4	31.5
Enterprises engaged in intramural R&D						
Manufacturing						
10-49 employees	70.9	62.6	65.8	69.2	60.2	63.9
50-249 employees	78.1	82	78.0	68.3	80.1	81.9
250 or more employees	90.5	76	87.6	87	88.7	88.8
All enterprises	74	67.7	71.5	70.4	67.6	71.1
Services						
10-49 employees	60.6	48.7	60.0	53.4	47.1	36.7
50-249 employees	57.9	68	65.9	54.8	58	59.1
250 or more employees	84.6	61.6	38.5	77.1	69.5	74.5
All enterprises	60.7	51.1	61.3	54.6	49.9	43.7
Total						
10-49 employees	--	56	61.6	61	52.9	48.2
50-249 employees	--	78.3	73.9	62.9	70.8	70.9
250 or more employees	--	72.3	79.9	83.7	81.3	83.1
All enterprises	68.6	60.6	66.6	62.8	58.4	56.3
Enterprises engaged in market introduction of innovation						
Manufacturing						
10-49 employees	43.8	26.4	43.1	35.3	29.2	30.3
50-249 employees	40.4	47.8	55.8	38.6	47.2	42.0
250 or more employees	70.7	40	72.2	63.3	60.9	66.3
All enterprises	45.4	32.2	49.6	38.3	36.3	36.6
Services						
10-49 employees	39.2	36.3	39.2	38.3	29.7	28.8
50-249 employees	46.2	58.7	55.3	53.2	45.6	48.9
250 or more employees	76.9	70.1	30.8	64.1	58.3	65.8
All enterprises	41.4	39.5	44.5	42	33.6	35.2

Data from the Community Innovation Survey	Wallonia			Belgium		
	2006	2008	2010	2006	2008	2010
Total						
10-49 employees	--	31.6	41.4	36.9	29.3	29.4
50-249 employees	--	50.6	55.7	44.7	46.6	44.9
250 or more employees	--	47.8	63.6	62.9	59.5	65.7
All enterprises	44.2	35.6	47.3	40.1	34.8	35.8
Enterprises engaged in other innovation activities						
Manufacturing						
10-49 employees	31.4	40	40.9	30.3	26.6	25.7
50-249 employees	38.4	57.2	50.8	35.2	48.5	43.0
250 or more employees	47.6	55	78.4	47.7	55	67.1
All enterprises	34.3	44.9	47.5	32.9	34.6	34.2
Services						
10-49 employees	17.2	34.8	35.2	23.9	34.2	21.0
50-249 employees	36.1	51.3	52.6	27.6	38.3	40.4
250 or more employees	92.3	40.3	46.2	50.3	53.6	52.2
All enterprises	22.8	36.7	41.6	25.6	35.7	27.0
Total						
10-49 employees	--	38.6	37.5	27	31.3	23.0
50-249 employees	--	55.3	51.8	32.1	44.4	41.9
250 or more employees	--	51.2	73.6	48.1	54.8	61.4
All enterprises	30.2	42.1	44.5	29.3	35.5	30.4
Enterprises engaged in training						
Manufacturing						
10-49 employees	70.6	69.9	65.9	63.8	59.9	53.3
50-249 employees	83.3	76.6	83.6	67.4	71.1	73.1
250 or more employees	85.5	88	93.8	80.8	80.3	85.9
All enterprises	74.4	72.4	73.7	66	64.4	61.7
Services						
10-49 employees	82.3	66.1	74.4	62.6	59.3	50.6
50-249 employees	89.6	86.2	80.3	77.9	76.3	79.5
250 or more employees	92.3	65.9	76.9	86.9	70.9	78.3
All enterprises	84	68.3	76.6	66.2	62.7	58.6
Total						
10-49 employees	--	67.1	67.4	63.2	59.1	51.9
50-249 employees	--	79.7	82.2	71.8	73.6	75.6
250 or more employees	--	82.2	91.2	82.6	76.5	83.3
All enterprises	77.7	69.9	73.6	66.2	63.3	60.0

Source: Data from the Community Innovation Survey (Eurostat), CFS/STAT; DGO6 – Technological Development.

Appendix D Statistical Data

	BE3 Région wallonne	Country	EU27	Year	Performance relative to	Performance relative to
	BE3	BE	EU27		EU27	BE
ECONOMIC INDICATORS						
GDP per capita (Euros)	24100	32700	24500	2010	98,4	73,7
GDP growth rate - (2000-2010)	3,62	3,50	2,93	2000-2010	123,5	103,4
Long term unemployment rate	4,99	3,45	4,14	2011	83,0	69,1
Labour productivity growth (%)	1,97	1,71	2,20	2000-2010	89,7	115,1
RCI 2013	0,37	1,59	0,00	2013	124,8	60,5
Share of employment in agriculture	0,02	0,01	0,05	2011	36,3	138,2
Share of employment in industry (including construction)	0,22	0,23	0,25	2011	87,2	93,9
Share of employment in business	0,28	0,30	0,30	2011	91,5	93,4
Share of employment in public sector	0,36	0,32	0,25	2011	144,5	113,6
Share of employment in S&T	0,08	0,09	0,09	2011	89,2	90,7
RESEARCH & TECHNOLOGY INDICATORS						
Employees with ISCED 5-6 (% all employees)	39,9	40,6	30,4	2011	131,1	98,3
Business R&D (% GDP)	1.7	1.4	1.2	2010	127,5	88,9
Government R&D (% GDP)	0,05	0,18	0,26	2010	19,2	27,8
Higher Education R&D (% GDP)	0,49	0,47	0,49	2010	100,0	104,3
EPO patent applications (per mln population)	114,31	142,00	114,99	2008	99,4	80,5
Employment in medium-high & high-tech manufacturing (% total employment)	4,63	5,55	6,39	2011	72,5	83,4
Employment in knowledge-intensive services (% total employment)	39,80	39,40	35,32	2011	112,7	101,0
Total R&D personnel (% active population) - numerator in head count - all sectors	1,41	1,85	1,53	2010	92,2	76,2
Structural funds on business innovations (Euros per mln population)	70,06	41,79	77,74	2007-2013	90,1	167,6

Structural funds on core RTDI (Euros per mln population)	43,83	25,79	63,01	2007-2013	69,6	169,9
LABOUR PRODUCTIVITY						
B-E - Industry (except construction)		91.775	71.853	2010	100,0	100,0
C - Manufacturing		81.569	56.378	2010	100,0	100,0
F - Construction	49.487	58.931	43.792	2010	113,0	84,0
G-I - Wholesale and retail trade, transport, accomodation and food service activities	54.912	62.250	37.843	2010	145,1	88,2
J - Information and communication	127.110	111.607	79.994	2010	158,9	113,9
L - Real estate activities	736.638	564.863	387.941	2010	189,9	130,4
M_N - Professional, scientific and technical activities; administrative and support service activities	60.478	71.799	39.717	2010	152,3	84,2
BUSINESS INNOVATION INDICATORS						
Technological (product or process) innovators (% of all SMEs)	0,53	0,60	0,40	2008	133,1	88,3
Non-technological (marketing or organisational) innovators (% of all SMEs)	0,49	0,55	0,38	2008	129,6	89,6
Innovative SMEs collaborating with others (% of all SMEs)	0,53	0,70	0,37	2008	142,7	75,4
SMEs innovating in-house (% of all SMEs)	0,56	0,62	0,39	2008	144,2	90,3

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