



European Union
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Development Fund

Smart Chemistry Specialisation Strategy

“Report on current status of implementation of Regional Innovation Strategies in Wallonia”

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Table of Content

1. Description	5
1.1 General Description.....	5
1.2 Economic Indicators	6
1.3 Challenges for the region	7
2. Description of chemical / bio economy industry	8
2.1 General Description.....	8
2.2 Indicators	9
2.3 Challenges for the industry.....	11
3. Description of ERDF Operational Programme (4 pages)	11
3.1 General Structure,	11
3.2 Responsible Bodies.....	12
3.3 Priority Axes and Available Funding	12
4. Description of Regional Innovation Strategy	15
4.1 General Description, Challenges and Objectives.....	15
4.2 Focus on chemistry / bio economy, etc. – highlight thematic priorities	17
4.3 Further activities to specify innovation topics (e.g. roadmaps).....	18
5. Description of Funding programmes.....	24
5.1 Investments in advanced equipment	25
5.2 development of research projects and exploitation of results.....	25
5.3 “demand pull” research support.....	26
5.4 Support for the implementation of demonstration units for SMEs within the approved research centres	26
5.5 Financing for innovative enterprises	26
5.6 Support for the financing of demonstration or pilot units	27
6. Governance.....	28
6.1 Description of involvement of innovation stakeholders in development and implementation of RIS with focus on chemical related topics	28
6.2 Description of established structures and stakeholders	29
7. Current Challenges for implementation of RIS and expectations to interregional learning	30

List of Figures

Figure 1:.....	5
Figure 2: SWOT	21
Figure 3:	21
Figure 4:	23

1. Description

1.1 General Description

Belgium is a federal State consisting of three regions: Brussels, Flanders and Wallonia. The regions have a substantial degree of autonomy, making the Belgian State one of the most advanced federal state in the world.

The regions' responsibilities include: trade, economy, employment, industrial policy, agriculture, and environment. Each region conducts a dynamic, made-to-measure economic policy.

Wallonia has an area of 16 844.3 km² which represents 55.2% of the Belgian territory. Wallonia has 3 576 325 inhabitants; namely 32,1% of the Belgian population.

The vast majority of the European economic market is directly accessible from Wallonia.



Figure 1:
Source:

A growth dynamic was triggered back in 2005 by the government thanks to 6 competitiveness clusters:

- Aeronautics and Space (Skywin)
- Agrifood (Wagralim)
- Life sciences (Biowin)
- Transport and Logistics (Logistics in Wallonia)
- Mechanical engineering (Mecatech)
- Environmental Technologies (GreenWin)

These clusters develop innovative projects carried by consortia of public and private players (companies, university research units, training centres).

1.2 Economic Indicators

For 2013, the **Walloon GDP** stands at nearly 94 billion Euros. This represents 24% of the Belgian GDP, or 0.7% of the domestic product of the European Union. Reported by capita, Walloon GDP is 12% lower than the EU average. Between 2008 and 2010, Wallonia best resisted the financial crisis than some others in the European Union with a greater preservation of employment during this period.

The gap between Wallonia and Belgium in terms of per capita GDP (i.e. -26%) is explained today first by the productivity gap. The apparent productivity work (ratio GDP and the number of jobs) is 12% lower than the national average. It must be emphasized that our country is still characterized by a high level of productivity. This is also the case for Wallonia.

Wallonia has a low **employment rate** (57% in 2014) compared to the national average (61.8% in 2014) but also the European one. For the whole EU, the employment rate of the 15 to 64 years-population passed from 64.4 to 64.00% between 2006 and 2013. Youth unemployment rate (15-24 years) is high (32.9% in 2014) and remains higher than the European and Belgian averages.

In Wallonia, 99% of the businesses are **SMEs**. This dominance is also reflected in the distribution of employment. SMEs employ over 78% of private sector employees and generate 18% of GDP. In ten years, the number of SMEs increased by 12% in Wallonia. The region counts about 270,000 SMEs.

In Wallonia, the **number of enterprises** is growing steadily since 2000. It rose from 202 789 to 223 844 active enterprises between 2006 and 2013. However, this increase keeps a lower rate than the two other Belgian regions. This inferiority lies in a high rate of disappearance of companies. Wallonia is facing a high number of early terminations of activities. The creation rate in Wallonia exceeds Flanders but termination rates are even higher so the net creation is relatively less important.

Non-transfer of business also explains the slowdown in the growth rate of the number of enterprises. It is generally considered that a third of SMEs could be handed over to new ones between 2010 and 2020 (IWEPS 2010). In addition, studies indicate that the probability of survival is higher for a takeover than for a creation of business.

Wallonia is well performing for **R&D expenditure** compared to the European average (2.51% of GDP in 2011). Commercial valorisation of the results of research remains a major challenge for Wallonia. As mentioned in the OECD report on innovation, Wallonia has to take advantage of innovation and resource endowments. It must also ensure dissemination of knowledge across the productive fabric.

Over the period 1996-2012, Wallonia has an average growth of 6.5% of its exports, behind Germany (+ 7.0%) and the Netherlands (+ 7.0%) within the EU. It is above the performance of Flanders (+6.2%) and France (+4.6%). Over the past ten years, exports have witnessed a constant and significant growth (almost 10% on average per annum). This growth outstrips the European average and that of most of its neighbouring countries. More than 75% of Wallonia's GDP is generated by exports, in a varied range of sectors. The **Walloon exports** amount to 52 billion Euros. Almost 82% of this total is made up of goods; the remaining 18%

are services. Industries contributing to exports are: pharmaceutical industry (16%), metallurgy and metal manufacturing (15%), chemical industry (9%), manufacture of machinery and equipment, the food industry (both 7%), then the manufacturing of plastics, rubber and mineral products (6%).

1.3 Challenges for the region

Promotion of **entrepreneurship** and of advanced services to SMEs is among the priorities for Wallonia. It is about to focus actions on the survival and growth of enterprises, more than on pure creative process. In order to **reduce the termination rate**, the SMEs' needs must be identified continuously through actions of territorial strategic intelligence. One of the barriers to their ability to innovate, develop or survive remains the lack of funding. Furthermore, SMEs need support and a framework allowing them to reduce costs through rational use of energy, proximity with other SMEs or physical and virtual accessibility. It is also useful to facilitate technology transfers needed to improve their competitiveness, or that they can benefit from research and development by working more intensively with research agencies or investing internally. Finally the SMES' network may densify in creating quality jobs and relying on workers with skills in constant line with market expectations.

Especially as the **reduction of youth unemployment** is a priority. It is necessary to develop training courses and high quality training programs adapted to labour market needs. More so as the dropout rate at school remains high in Wallonia (14.7% in 2014). Young people can find a second chance in the network of competence centres to access new skills quickly leading to employment. In addition, the rate of participation in continuing education is low. Lifelong learning is not exploited enough in Wallonia although it could limit the problem of stagnation in unemployment.

Foreign direct investments in Wallonia are still lower than the national average. According to foreign investors, Wallonia has some weaknesses (qualification, lack of multilingualism, lack of R & D resources...) It must improve these to increase its attractiveness.

Wallonia is the archetype of a **very small and open economy**. This economic openness concerns the situation of workers and consumers and of producers.

Walloon businesses consume more intermediate goods and services produced in Flanders and Brussels than the opposite.

We can see a lack of domestic economic activity internal to the region. This activity hardly meets the requirements for goods and services of its own actors and has difficulty to generate sufficient local employment, so that clearly poses the challenge of domestic growth. The development of the domestic activity is related to the question of **industrial policy**. As Wallonia is a small open economy, relying heavily on imports, the region has to generate revenues beyond its narrow market. This is a challenge which is obviously not unique to Wallonia; it is shared by most of European economies.

Today growth is constantly questioned as well as its drivers and capacity to generate jobs. We can see this challenge as the ability for Wallonia to combine, in an optimal way,

economic growth, employment and productivity through high added value jobs activities enabling high added value jobs.

This requirement is part of an international environment where economic growth is slowing tendentially, even before the financial crisis and its aftershocks.

In such a context, a sustained increase in growth rates can only be based on **innovation** and the emergence **new technological developments** to improve the competitiveness.

More generally, the analysis of the **competitive factors** in Wallonia shows a mixed picture. Thus, the relative unit labour costs appear to have evolved in a rather advantageous way to the dawn of the crisis, but not in an uniform way in the various sectors of industry. “Non-price“competitive factors also present gloomy figures. Thus, the R&D efforts are among the highest in Europe, but they remain concentrated in the hands of a small number of actors. In addition, Wallonia ranks lower in terms of scientific qualification or patents and innovations come less frequently in the commercialization phase. The entrepreneurial dynamic is also showing signs of weakness, particularly in market services. Then competitiveness reveals that the evolution of exports during 2000s must also be appreciated with nuance. The regional export growth has benefited more from sectoral than geographical specialization.

Axes of industrial regional development cannot be considered without taking into account the activities of neighbouring regions. It also illustrates the possibility of the emergence of a **deeply rooted regional business mix**.

2. Description of chemical / bio economy industry

2.1 General Description

Chemical and life sciences sectors represent the **second industrial activity** in Wallonia, representing nearly **25%** of the turnover of the entire Walloon manufacturing industry. The pharmaceutical industry and basic chemistry account for 70% of the sector in Wallonia.

- It represents:
- more than **200 enterprises** including 25% SMEs
- more than **26.000 direct jobs** and 40.000 indirect jobs
- a turnover of **€11 billion**
- large investments in **infrastructure** averaging €500 million/year

The sector is a source of development of the region. A significant number of investments and research projects concern the biopharmaceutical or green chemical production. Wallonia meets favourable conditions for the development of this sector at the forefront of innovation in particular thanks to its geographical location at the crossroads of Europe and the quality of its human resources.

The life sciences industry and industrial biotechnology is one of the **innovation leaders** in Wallonia. Technological change offers new development prospects. In the field of chemistry, transition to **bio-based chemistry** represents a small revolution. Indeed, the substitution of fossil raw materials by plant molecules requires knowledge in process chemistry and

biotechnology. Besides, aside manufacturing fuels, plastics or plant varieties, biotechnologies can also be used to make completely new products, such as medical treatments, for example cancer drugs. We see there a strong potential for further developing **new innovative value chains** based on green chemistry. Strongest linkages are to be found with the pharmaceutical sector, which is a driver for regional growth. Continued development and application of biotechnology will assist in the long-term goal of decoupling economic growth from use of these finite resources.

Indeed, innovation is crucial to the sector in order to meet the climate challenge and to ensure the anchoring of the sector in our region and in Europe.

The Walloon Government has put a clear focus **on resource efficiency and circular economy** since 2009 through its regional development plan, the Marshall Plan 2.Green. Building on this experience, the **smart specialization strategy**¹ adopted by the Walloon Government aims at further developing the competitive advantages of the chemical industry in Wallonia, particularly of green chemistry, notably through its Greenwin Cluster dedicated to green chemistry and sustainable materials². Furthermore, in its Regional Policy Declaration, the Walloon Government identified the Circular Economy as a priority aiming at supporting the development of its industry. As such, the so-called NEXT programme is fully dedicated to circular economy and is a transversal axis for deepening the Walloon Strategy for smart specialization, through its linkages with other key sectors and clusters (biotechnology and health, agro-business, mechanical engineering, green chemistry and sustainable materials, transport and logistics, aeronautics and space). The development of the bio-economy, sustainable industrial policy, eco-innovation, environmental technologies are clearly identified as the major factors in the development of sustainable and efficient Walloon economy in the use of resources.

This approach is central of the regional development Plan 2015-2019 of the Walloon Government, the Marshall Plan 4.0, which intends to refocus the priorities of the economic redeployment around the circular economy, the creative economy and the digital economy to strengthen the economic attractiveness of Wallonia.

2.2 Indicators

Chemical and pharmaceutical sectors (nace 20-21-22) stands for about **40%** (37% in 2013) **of the Walloon industrial activity** in terms of created wealth. This performance reflects the impact of chemistry, plastics and life sciences on the Walloon industrial fabric and the high sector specialization degree of chemical and life sciences sector in Wallonia.

The sectors of the chemical industry and life sciences cover together many varied activities such as basic chemicals, pharmaceuticals, detergents and cosmetics, biotechnology and products for agriculture. Today, this sector has reached in Wallonia a level of **specialization**

¹ <http://economie.wallonie.be/content/la-strat%C3%A9gie-de-sp%C3%A9cialisation-intelligente-de-la-wallonie-%C3%A9t%C3%A9-adopt%C3%A9e-par-le-gouvernement>

² www.greenwin.be

that is among the highest in the world. **Employment** in the chemicals industry, plastics and life sciences in Wallonia amounted to **26.000 people** in 2014, an increase of 0.4% over 2013. This increase due to the growth of the pharmaceutical industry is a great performance especially since the sector represents more than 21% of the manufacturing employment in Wallonia against 17% ten years ago.

In this context, the Walloon chemical and life sciences sectors continued to record an estimated **growth of turnover about 10%** to almost reach € 14 billion in 2014 (estimated). Performance in terms of production volume of the principal subsectors were diverse. Pharma sector, less sensitive to cyclical factors, recorded very positive results in 2014. Meanwhile, Walloon chemical industry recorded a slight decline of its

volume production (-1.8%). Production remained stable in plastics and rubber processings. Chemical industry and life sciences continue to invest in their production tools. **Sector's investments** in fixed assets amounted to about **€ 1.8 billion in 2014**, in Belgium (trend levels of the past decade). These investments account for nearly 30% of investments made in the Belgian manufacturing industry. Sector's investments in fixed assets is estimated to € 500 million in 2014 in Wallonia.

The chemical, plastics and life sciences industry is a globalized industry strongly oriented to export. In 2014, **the industry exported € 18 billion** of chemicals, plastics and life sciences, a strong increase compared to 2013 (+ 12.4%). It is the **first export sector** in Wallonia and represents **42% of total Walloon exports** in 2014 against 29% in 2004. The commercial account balance of chemical, plastics and life sciences sector in Wallonia is structurally positive and amounted to € 6.6 billion in 2014.

The continuing rise in **spending on research and development** in the chemical industry, plastics and life science Walloon industry continued in 2014 to **€ 1.5 billion**, i.e. half the Belgian R&D expenditures in chemistry, plastics and life science industry. The sector accounts for over 60% of private R & D expenses. In 10 years, R & D expenses of the sector have more than **doubled** in Wallonia. More than 80% of these expenditures were made in the life sciences (Biopharmaceutical). However, R & D in chemical industry occupies a significant share with approximately € 200 million of annual expenditures.

Green chemistry amounts for 3.000 employees and 10 % of the chemical turnover in Wallonia, which also host a number of large, small and medium enterprises along the whole value chain as well as a large panel of knowledge producers (5 universities, 11 high schools and 11 research centres) active in the field.

Finally, green chemistry and biotechnology imply the utilization of biomass as raw materials. Wallonia has an important biomass potential from forestry resources (50.000 to 120.000 m³ hardwood, 400.000 m³ black liquor, co-product of paper industry) and agricultural resources (primary production of corn straws (60.000 t/year) and beets (300.000 t/year), co-products from agro-food industry (400.000 t/year) and green (60.000 t/year) and households waste (300.000 t/year)).

2.3 Challenges for the industry

The chemical sector in Wallonia is **highly internationalised** and faces of **strong competitive pressure**. The value chains analysis³ has shown that the sector is characterized by strong intra-regional linkages with a large panel of other regional branches using chemical products as an input (pharmaceuticals, health, glass, plastics, metal, construction, agriculture,...).

The sector faces a **quantitative shortage of trained scientific and technical personnel** who may replace the many departures for retirement in 2020.

The high level of demand of **multiple legislative standards** (health, environment, quality control standards, ...) and their complexity can be a competitive disadvantage for Walloon enterprises compared to countries that would apply these rules less strictly.

Transition to **plant chemistry** represents a small revolution. **Bio economy** is identified as a strong axis in the regional answer to key challenges we are facing today. In a willingness to strengthen the competitiveness of its industrial base and its comparative advantages, the Region aims at reducing the dependence on natural resources, transforming industry, promoting sustainable production of renewable resources from land, fisheries and aquaculture and their conversion into food, feed, fibre, bio-based products and bio-energy, while growing new jobs and innovative value chains in particular in chemical /life sciences industries, and technologies and services that support them. The **new business opportunities** and the development of **emerging industries** arising alongside would rely on the smart exploitation of biomasses and high added value products and services.

Wallonia has an important **biomass potential** from forestry resources and agricultural resources, co-products from agro-food industry and green and households waste. It is crucial to develop expertise and know-how in **high value-added bio-based molecules** (ex: micro-nano-algae,...). Wallonia has to develop a **critical mass** where bio-based industries are sufficiently consolidated and integrated.

3. Description of ERDF Operational Programme (4 pages)

3.1 General Structure

Cohesion policy for 2014-2020 focuses on the priorities of the 'Europe 2020' aiming for smart, sustainable and inclusive. All Wallonia may benefit from ERDF and ESF. However, it is divided into two regions:

- Transition (GDP / head > 75% and <90% of the EU average), namely the provinces of Hainaut, Namur, Liege and Luxembourg;
- More developed (GDP / head > 90% of the EU average), the province of Walloon Brabant.

³ « Etude relative à la caractérisation des chaînes de valeur industrielles en Wallonie et au positionnement de l'industrie wallonne au sein des chaînes de valeur mondiales », IDEA Consult pour le compte du SPW-DGO6, 2013.

The strategy and the choice of investment priorities are broadly consistent with major regional issues, as well as the priorities, requirements and EU recommendations for the new programming period 2014-2020.

The transition to a low carbon economy is a transversal priority with a specific budget (nearly 20% of the ERDF) which represents one of the important developments of this new programming.

3.2 Responsible Bodies

The **Department for Coordination of Structural Funds** of the Public Service of Wallonia is specifically responsible for ensuring coordination, daily monitoring and the implementation of European programs "Convergence" and "Regional Competitiveness and Employment" co-financed by the ERDF.

It also represents an interface between Wallonia and DG Regio (European Commission). In addition, it is responsible for the management of calls for projects and daily monitoring of programs by centralizing information from services that have the administrative supervision of co-financed projects.

Besides the department is responsible for the monitoring of ongoing projects, particularly through support committees meeting regularly and bringing together all the actors of the projects.

Finally, it is responsible for accounting control over parts of expenditure, including those under the territorial cooperation objective Interreg IV (Greater Region and France-Wallonia-Flanders).

3.3 Priority Axes and Available Funding

The axes and measures are co-financed by the ERDF up to 681M€ for a total budget of 1.703 M€:

Axis 1 "Economy 2020" aims to strengthen the competitiveness of Walloon companies and improve labour productivity. The objective is to raise the employment rate and the value added produced within the Walloon economy by creating enterprises and through growth of existing SMEs, in terms of employment. The new programming period is characterized by the launch of a targeted proactive approach on a limited number of SMEs with growth potential by helping those on strategic functions. Specific actions on circular economy and resource efficiency are developed.

The expected change through the implementation of the priority axis 1 is a strengthening of the competitiveness of Walloon SMEs through densification and diversification (no competition by cost -high social protection -but rather differentiated by quality). SMEs and value chains where they are inserted, are an engine for growth, employment and cohesion. They have an important role to play in managing structural change, the transition to a sustainable economy.

In this sense, SMEs have a key role to play in deepening Walloon Smart Specialization's dynamic and entrepreneurial and innovation processes at work in the regional ecosystem.

Walloon enterprises have to consider their development through internationalization relying on existing public and private Walloon structures. It is necessary therefore to ensure readability and visibility for these support measures

In addition, Wallonia has implemented a transversal program focused on circular economy. It is indeed essential that enterprises are part of the challenge of sustainable growth through resource efficiency and the creation of innovative business models (products, processes, channels, etc.).

Axis 1 Total budget = € 490,879,480

Axis 2 "Innovation 2020" aims to contribute to the flagship initiative of the strategy "Europe 2020" dedicated to innovation. (See point 5)

The critical issues for Wallonia are increasing the number of SMEs involved in innovation efforts and the private investment. To achieve this, it is necessary to support RDI, with a priority on innovation and marketing, non-technological innovation, eco-innovation, ICT, KET.

Interventions will target innovation dynamic and the link with the market. Approximation measures for SMEs and research centers, strengthening the response capacity of the research centres in useful areas for SMEs will be developed. A focus will be put on industrial valorisation of R&DI projects through a mobilization of efficient tools or an improved access to finance.

It is also necessary to strengthen the regional approach of the smart specialization, based in large part on regional clustering policy. The objectives include stimulating spill over effects of the Competitiveness Clusters on all the regional economy, but also to stimulate the emergence of new sources of growth and innovation in the regional ecosystem in order to feed the Clusters' dynamics and stimulate overall competitiveness of the economy (entrepreneurial discovery process)

Besides the specialization areas of the Clusters, we can point sectors of creative and cultural industries and of knowledge-intensive services. There are essential supports to stimulate the dynamics of innovation and added-value's creation within clusters.

The challenge is to broaden the number of SMEs involved in innovation activities (technological or non-technological) and to increase the level of private investment in this area. In this perspective the approach is rebalanced in favour of an approach more focused on SMEs demand ("Demand pull") than on the technological offer ("Technology push"). This results in:

- i. strengthening measures that enable more SMEs to innovate, such as technological vouchers or financial engineering,
- ii. willingness to increase interaction and the number of SMEs cooperating with research centres
- iii. greater attention paid to the short-term valorisation.

The action of the Structural Funds is also a base to enable Walloon stakeholders to participate in other EU programs and initiatives. In particular Horizon 2020 and COSME, or

the European Innovation partnerships (EIP) It is a fundamental axis of the deepening of the smart specialization process.

Axis 2 total budget: € 439.481.114

Axis 3 "Territorial Intelligence 2020" supports integrated urban policies promoting sustainable development, smart and inclusive cities.

Axis 3 embodies the will of focusing one part of interventions in urban centres (cities or larger urban zones), in industrial areas and transborder zones.

This priority axis is characterized by a multidimensional dynamic, Smart cities, attractiveness and sustainable growth, which are fully in the objectives of the EU 2020 strategy. Urban development is a key issue for the European Union in the context of cohesion policy. The aim is to support integrated urban policies to promote sustainable urban development and strengthen role of cities as part of a smart, sustainable and inclusive growth. The development of smart mobility and / or sustainable is an important challenge for cities. The infrastructure and mobility projects should be developed in a long-term perspective in which future needs, urban development, space and technology future and the reduction of greenhouse gases are considered.

Axis 3 total budget: € 310.004.052

Axis 4 "Transition to a low carbon Wallonia" is characterized by a multi-dimensional approach to sustainable development (renewable energy, energy-efficient public buildings, sustainable mobility and / or multimodal, cogeneration, ...).

This priority is characterized by a multidimensional approach of sustainable development. Actions supported through this axis will contribute to greenhouse gas emissions reduction targets in Wallonia. The actions supported will contribute to:

- increase the production of electricity and heat from renewable energy sources
- have more energy efficient public buildings
- strengthen sustainable mobility and multimodal mobility
- increase production and use of the heat/power cogeneration
- reduce energy costs of the enterprises.

Axis 4 total budget: € 273.779.812

Axis 5 "Integrated Urban Development 2020" is based on a dynamic combining several dimensions of development of urban centres ("smart cities"): employment, densification of cities and contribution to reducing GHG emissions.

The axis 5 focuses on three priorities:

- Employment in urban centres, through the establishment or the development of enterprises or shops, reception facilities, culture and tourism with a view to job creation,...
- Densification of urban areas with a view to sustainable development (fight against suburbanization and urban sprawl, etc.) and to strengthening the agglomerations' economy, around actions to make the city more attractive
- The contribution to reducing greenhouse gas emissions through actions on sustainable mobility, energy efficiency and development of renewable energy

Axis 5 total budget: € 85.168.768

Axis 6 "Competence 2020" aims to promote the adequacy of the workforce to business needs by developing skills and learning throughout life.

The objective of this axis is to promote the adequacy of workforce to business needs. To meet this suitability, it is essential to offer this workforce- employed or not- the possibility of developing skills. Including, through enrolling in a long learning of life. In connection with the growth sectors in Wallonia and axis 2 INNOVATION, workforce has to be trained, within training centres, via advanced equipment. These facilities and related infrastructure must indeed enable trainees to adapt to jobs of the future or to adapt to changes in different business sectors.

This means, among other things, that it is essential for the training centres to have the infrastructure and ad hoc equipment, and the capability to evolve in parallel to socio-economic developments of the region.

Axis 6 total budget: € 69.994.644

4. Description of Regional Innovation Strategy

4.1 General Description, Challenges and Objectives

Marshall Plan 4.0, the economic recovery plan for Wallonia, is the consolidation of a regional policy of sustainable industrial innovation, and the contribution to European objectives in terms of re-industrialization and innovation. It will actively support the transition of the Walloon economy to a **competitive, open, innovative and sustainable** model. The main objective of support to competitiveness, job creation and added value will be pursued through cross mobilization of industrial policy, research and innovation, support to entrepreneurship, and concepts of sustainable development.

Competitiveness will be strengthened by acting on the different levels of productivity factors (investment, R & D and innovation and creativity, ICT, internationalization, skills) and

supporting a transition towards an (eco) efficient model so as to strengthen their cost competitiveness (reducing cost of energy inputs, efficiency in processes, reuse and recycling, ...). Secondly, business creation and development of new niches of enabling activities will also be supported, particularly in the areas of "green" economy.

The **smart specialization strategy** is the **framework for the entire research and innovation policy** in Wallonia.

The heart of the Walloon smart specialization strategy 2014 -2020 is **clustering policies** designed to stimulate the development of niches in regional specialization areas based on collaborative and dynamic innovation.

The objectives include stimulating the spill over effects of Competitiveness Clusters on all the regional economy, but also stimulating the emergence of new sources of growth and innovation in the regional ecosystem. It would feed the clusters' dynamics and boost the overall competitiveness of the economy (entrepreneurial discovery process). These pulses will be activated relying on the current policy initiatives and enhancing the coherence and overall effectiveness of the policy mix. The links between the Clusters policy and other levers of economic and innovation policy will be strengthened.

Strategic priorities of clusters are regularly reassessed on the basis of evaluations available, on the recommendations of an independent jury of on the changing context.

The competitiveness clusters are mainly composed of enterprises and of a vast majority of SMEs. So, agility with which innovation strategies can be adapted is a key success factor. Therefore, through the deepening themes proposed for smart specialization strategy, continuous feeding of the innovation dynamics and entrepreneurial discovery processes will be stimulated in clusters and in the whole regional ecosystem. That is the objective of actions involving and supporting innovative SMEs, stimulating cross-sectoral dynamics, promoting participation in European programs and networks, ...

Clusters, based on a mix of **industrial and technological approaches** and based on **cross-sectoral dynamics** are in a **"value chain" approach**. Reinforcements will be sought, particularly in the areas of Key Enabling Technologies (KET) defined by the Commission.

The priority areas of smart specialization covered by Clusters are:

➤ **MECATECH**

Mechanical engineering, materials and surfaces of the future, technology made forms, additive manufacturing, microtechnology and mechatronics, intelligent maintenance.

➤ **GreenWin**

green chemistry, environmental technology, treatment and reuse of waste and effluents, water management, waste, management and storage of energy, sustainable construction and renovation)

➤ **LOGISTICS IN WALLONIA**

Transport, logistics and mobility, multimodality, sustainable logistics, the chain security procurement, internal logistics and industrial processes management

➤ SKYWIN

composites and metal alloys, industrial process, embedded systems, airport services, systems and space applications, modeling and simulations.

➤ BIOWIN

Biomarkers, diagnostics in vitro and in vivo, innovative equipment, medicines innovative delivery systems, advanced therapies (cell therapy, Proton therapy), IT applied to human health, medical equipment, medicines research, and innovative organisational processes

➤ Wagralim

health and nutritional quality food, industrial efficiency, packaging and sustainable agro-industries

In addition to the specialization fields of the Poles, close attention will be paid to the creative and cultural industries sectors, as well as knowledge-intensive services, as key support points for the stimulation of dynamics of innovation and of value added creation in the Clusters.

To sum up, the **deepening axis** of the smart specialization strategy of Wallonia are:

- Innovation-TIC-KET
- Internationalisation- Europe
- Creative Economy
- high potential SMEs
- Resource efficiency

The objective is to strengthen research, technological development and innovation by

promoting business investment in R&DI and **developing links and synergies between stakeholders**: companies, research and development centres, higher education sector and competitiveness clusters.

4.2 Focus on chemistry / bio economy, etc. – highlight thematic priorities

Chemical industry, and especially sustainable chemical production are among priorities of the S3 of Wallonia.

Among the priority areas of Greenwin cluster, we can find **green and bio-sourced chemical production**. Its priorities also include treatment and reuse of waste and effluents, environmental technologies, waste water management, management and storage of energy, sustainable building and renovation. Regarding Wagralim cluster, its fields of action are sustainable agro-food industry, health and nutritional quality of food, industrial efficiency and packaging.

The development of the bio-economy, sustainable industrial policy, eco-innovation, environmental technologies are clearly identified as the major factors in the development of sustainable and efficient Walloon economy in the use of resources.

Technological change offers new development prospects. In the field of chemistry, transition to plant chemistry represents a small revolution. Indeed, the substitution of fossil raw materials by plant molecules requires knowledge in process chemistry and biotechnology. Besides, aside manufacturing fuels, plastics or plant varieties, biotechnologies can also be used to make completely new products, such as medical treatments, for example cancer drugs.

We see there a strong potential for further developing **new innovative value chains** based on green chemistry. Strongest linkages are to be found with the pharmaceutical sector, which is a driver for regional growth. Continued development and application of biotechnology will assist in the long-term goal of decoupling economic growth from use of these finite resources.

Therefore, bio economy is identified as a strong axis in the regional answer **to key challenges** we are facing today. In a willingness to strengthen the competitiveness of its **industrial base and its comparative advantages**, the Region aims at reducing the dependence on natural resources, transforming industry, promoting sustainable production of renewable resources from land, fisheries and aquaculture and their conversion into food, feed, fibre, bio-based products and bio-energy, while growing new jobs and **innovative value chains** in particular in chemical /life sciences industries, and technologies and services that support them. The new business opportunities and the development of emerging industries arising alongside would rely on the smart exploitation of biomasses and high added value products and services

4.3 Further activities to specify innovation topics (e.g. roadmaps)

To implement smart specialization strategy, various **support programs** are enforced (continued mostly) at **Walloon level** (Marshall Plan 4.0, CREATIVE WALLONIA, Digital Wallonia, Small Business Act, NEXT) and at **European level** (Europe 2020

Strategy, Horizon 2020, COSME, ...), which will be activated and for which external collaborations will be fostered.

To consolidate the regional strategy for smart specialization, four axes of deepening were identified. These will be declined in the policy of competitiveness clusters and in projects that will be submitted for funding.

1. Stimulation of R & D and innovation dynamics, taking into account all cycle of innovation and creativity, all types of innovation and the potential to remove cross-fertilization between sectors (Sectors / clusters)

To enhance the impact of policies on the regional economy, a stronger emphasis will be placed on the development of industrial research, the deployment of key enabling technologies (Kets) including ICT, marketing and link to markets.

Non-technological innovation will be encouraged, notably based on the interaction between industries and services, particularly in the fields of creativity and ICT. Demand-driven and user-driven (such as living labs / fab labs) politics will be strengthened in order to stimulate

the dissemination and adoption of technologies on the market (including through technology transfer), and meet societal challenges.

The objective is also to widespread an innovation culture within the Society (students, teachers, researchers, entrepreneurs,...) relying on the dynamics of the **Creative Wallonia** blueprint.

This linkage industry / services will be likely to foster the modernization of the industrial base and consolidate the value chain.

2. SMEs 'involvement in the industrial and innovation dynamics - stimulate innovative entrepreneurship

SMEs are at the heart of the Walloon economy, and their greater involvement in the innovation dynamics is a necessity for maximizing spill over effects of this policy on the regional economy.

More suitable support conditions will be developed, and procedures will be simplified. Since 2011, the **Walloon Small Business Act (SBA)** gives priority to SMEs. This roadmap for the Walloon SME policy has recently confirmed the priority areas (entrepreneurship, innovation, internationalisation, financing and simplification).

Increased focus will be put on creativity, non-technological innovation and articulation with the services in charge of SMEs support.

3. Internationalisation of innovation and industrial stakeholders, through increased coordination with European programs, greater involvement in European networks and bilateral and interregional cooperation

In view of a stronger integration of the international dimension within the Smart Specialisation Strategy, a thinking was initiated in early 2014 in cooperation with the Competitiveness Clusters, and will be actively pursued. The aim is to highlight areas of technology / application in which Wallonia has promising niches to be developed.

In parallel, a larger reflection was initiated to develop a common and coordinated strategy to mobilize more effectively European programs, including Horizon 2020 , COSME, Vanguard initiative, ECRN, Bio-based industries consortium,.... This is to enable synergies between operators active on the international field, to ensure better flows of information, to better reflect the relationships between regional and European policies, both in terms of priorities, implementation and access to finance, and a greater participation in European calls for projects.

4. Strengthening the dimension of sustainable development and boosting efficiency in resource utilization as transverse axis industrial policy and innovation.

Various initiatives have been taken to support the Walloon industrial policy towards sustainability.

Circular economy is a transversal axis to the Clusters. Various projects were developed: **Reverse Metallurgy**, **VERDIR** (urban agriculture and green chemical production), **NEXT** (circular economy programme), short circuits economy,...

Promoting efficient use of resources opens up significant economic opportunities through productivity gains, reduced costs and opening new markets. The development of "green technologies" and eco-innovation will provide additional impetus to innovation and job creation. Sustainable industrial policy, eco-innovation, the development of the bio-economy, environmental technologies are major factors in the development of sustainable and efficient Walloon economy in the use of resources.

The transition to a competitive low carbon requires finding innovative solutions in the fields of energy, transport, industry and ICT. In this respect, the eco-innovation can enhance the competitiveness of Walloon industry, open new export markets and create new jobs.

An approach to develop a **regional bio-based economy strategy** was launched in 2013 through the public-private partnership: "**Coq Vert**" initiative⁴ but this first step requires to be further developed. The aim of the initiative is to develop a regional bio-based economy strategy but also to identify innovation projects and required investments. The focus is put on recycling biomass materials from non-food resources (by-products, residual products, waste etc.) and on second-generation bio-refineries as future perspective for Wallonia.

A first SWOT analysis focused on the regional assets, was developed to support the strategic reflections. For further building on those first achievements and potentials, Wallonia needs and desires to develop an ambitious strategy leading to large-scale investments in industrial projects.

⁴ "**Coq vert**" is an initiative that was launched in 2013 by a public-private partnership between the [GreenWin](#) cluster, the [AWEX](#)-Foreign investment and [ValBiom](#), in partnership with [Essenscia-Wallonie](#) . <http://www.coqvert.be/>.

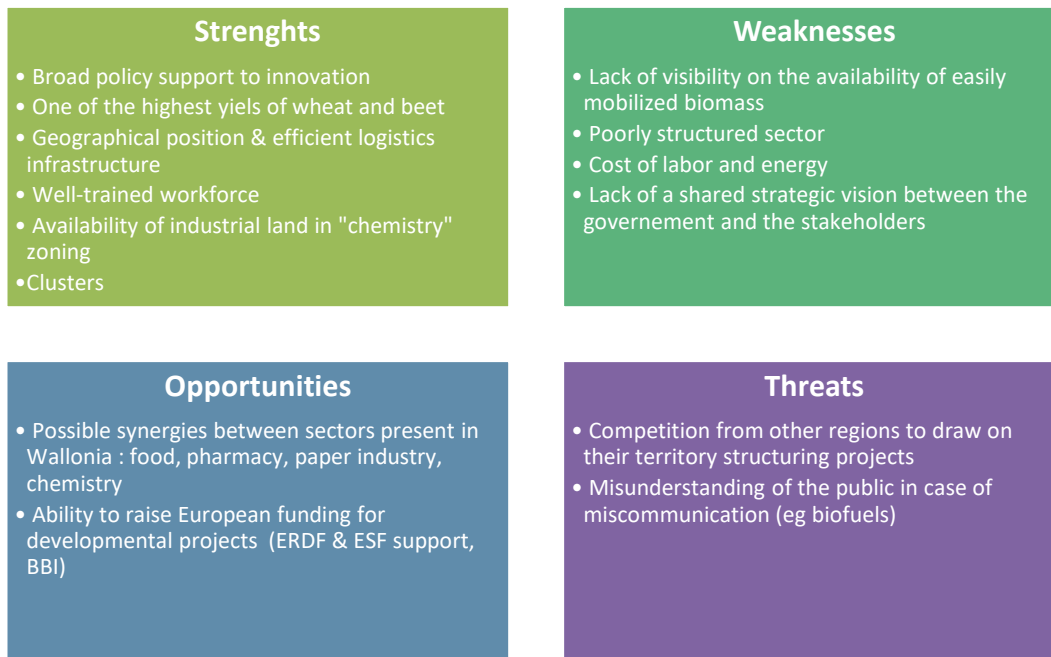


Figure 2: SWOT
Source:

This vision for reindustrialization through bio-economy needs the ongoing dedication and commitment of all stakeholders to make it happen: clusters, chemical companies, local companies, research and education institutions, capital providers, public actors, encouraging a more efficient and circular approach to resource use and management.

Wallonia needs an integrated and holistic approach taking into account its strengths and potentials in the European context, as well as opportunities from European programmes and networks. It will be essential to have coherent policy across many sectors, such as climate action, energy security, renewable feedstock supplies, research and innovation, agriculture, the environment...

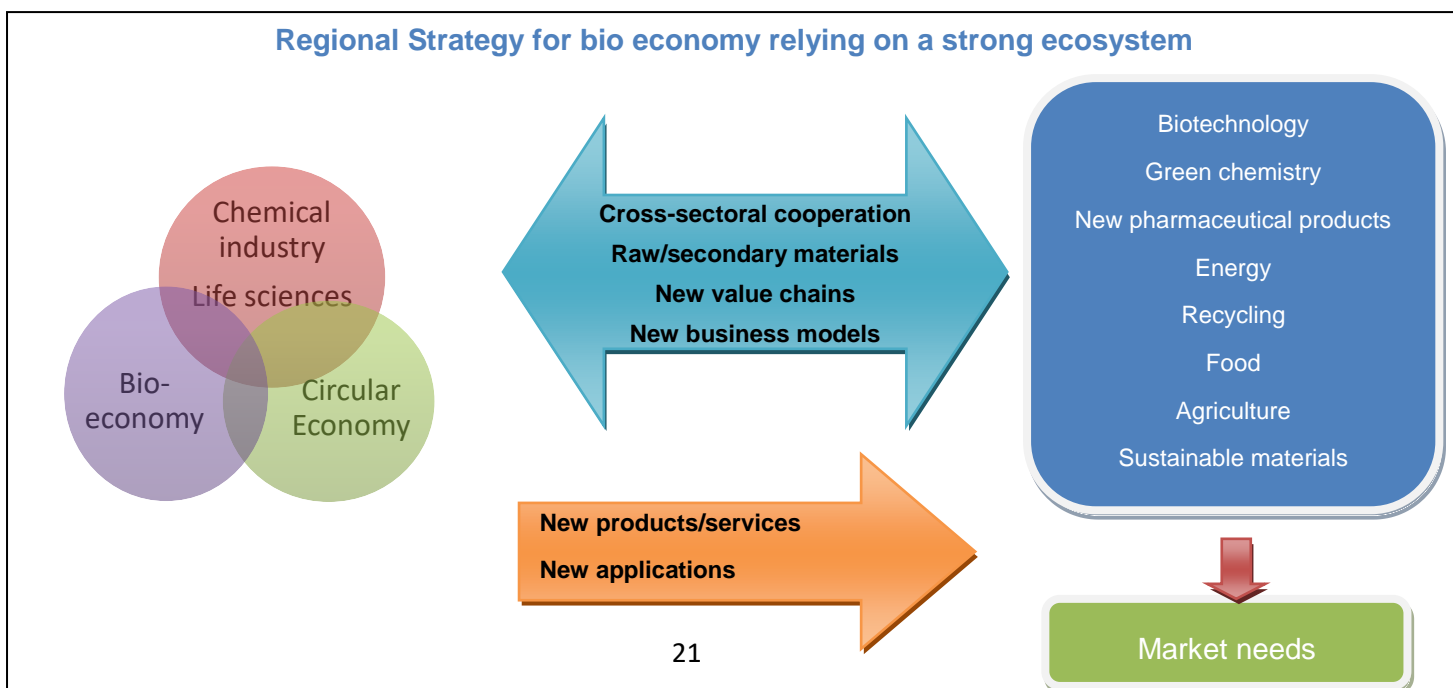


Figure 3:
Source:

The consolidation and deepening of the S3 in the field of sustainable chemistry through the Walloon and European tools can be schematized as follows:

SUSTAINABLE CHEMICAL PRODUCTION & S3- CONSOLIDATION & DEEPENING OF OUR STRATEGY

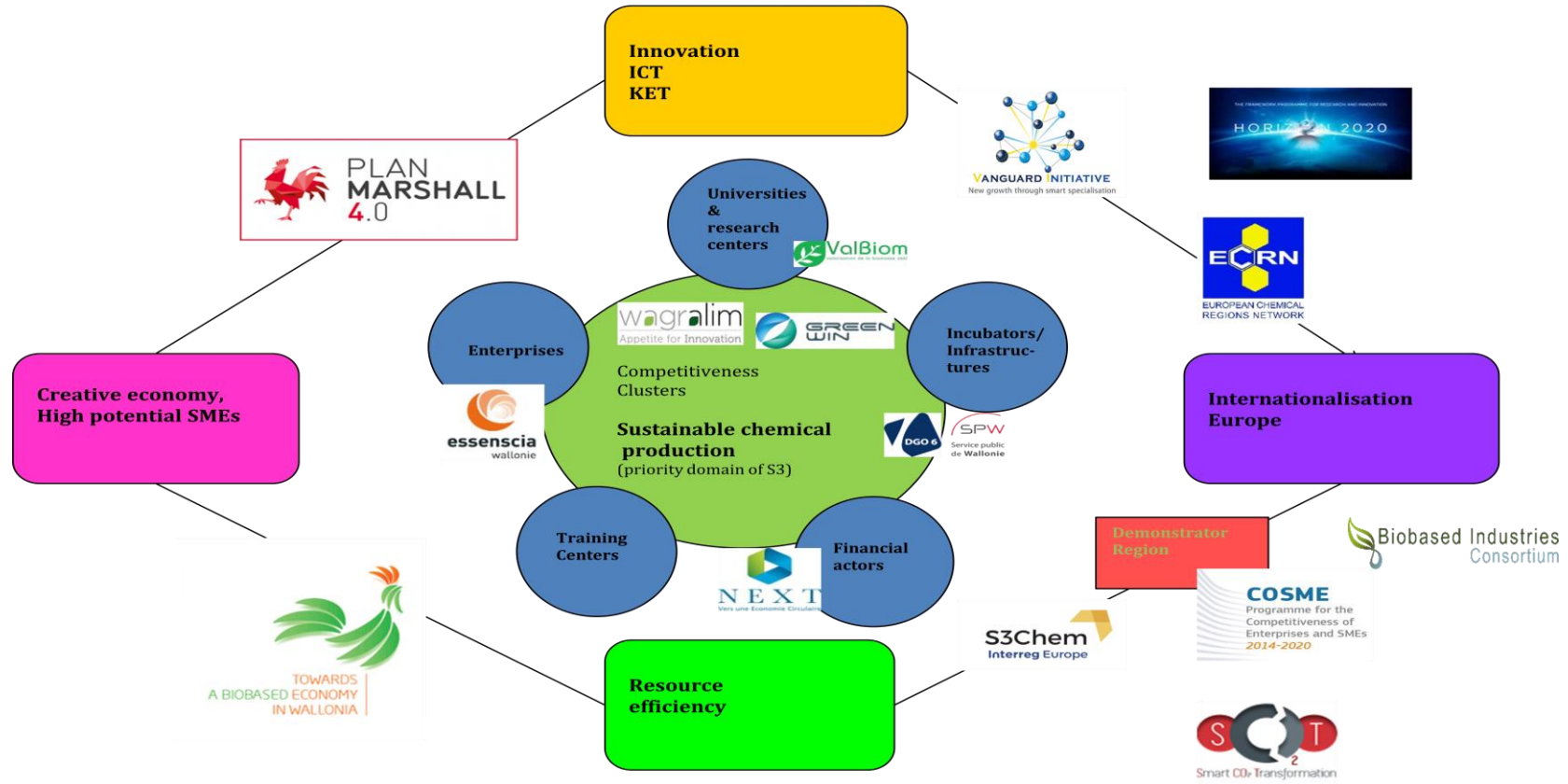


Figure 4:
Source

5. Description of Funding programmes

Axis 2 of the ERDF Operational programme defines innovation funding.

The challenge is to broaden the number of SMEs involved in innovation activities (technological or non-technological) and to increase the level of private investment in this area.

Efforts in axis 2 primarily focus on projects involving **SMEs** wishing to engage in an innovation process of products, processes or services. This should contribute to a more systemic approach of research and innovation and to the empowerment of beneficiaries of subsidies. These products, processes or services, should materialize by a profitable industrial exploitation.

The existence of collaborations with research centres or other businesses as well as the link with the techno economic areas identified by the clusters policy and smart the specialization strategy, will be favoured.

In this perspective the approach is rebalanced in favour of a more focused approach on **SMEs demand ("Demand pull")** than on the technological offer ("Technology push). **Innovation** is identified as a cornerstone of industrial development in Wallonia. R&DI support will focus on innovation and marketing, non technological and technological innovation, eco-innovation and Key Enabling technologies (KET).

This axis aims to support the link between research and economic policy, the link between technological and non-technological innovation, including eco-innovation.

Meanwhile, the adaptation of the workforce to innovation is another issue that will be met through training in "skills centres". Initiatives in this area will be supported via the axis 6.

The projects supported by the ERDF in the framework of this axis will enter in the Clusters' action areas and fit into the smart specialization strategy, or S3, implemented by Wallonia.

We aim to see how some ERDF funding measures, including through the axis Innovation 2020, support a **structuring sector for Wallonia**, such as chemical production. The total budget of axis 2 is €439.481.114. The budget amounts to € 410.3M in the "Transition" area and €29.1M in the " more developed" zone. Following the 1st call for public projects (excluding measures c, e, and f), 206 projects within 34 portfolios were pre-selected amounting to €210M (including 16 projects in the "more developed" area amounting to €10.7M)

Here are the different measures. Some of them have not yet started.

5.1 Investments in advanced equipment

This measure aims to provide the Walloon research centres with technological high-level equipment in order to enable enterprises to develop an effective technological activity in partnership with research centres (universities, colleges and accredited research centres).

19 projects have been selected for an ERDF amount of 18.419.729€.

Some of them could have a link with chemical industry or the bio economy:

- IAWATHA: additive technologies
- MICRO+
- Low Carbon Footprint Materials - Bio-sourced composites

The projects'sheets of the 1st call are currently being finalized.

5.2 development of research projects and exploitation of results

The actions of these measures are split into two parts:

- the first part concerns the research projects conducted in partnership between research centres
- The second concerns research projects conducted in partnership between research centres on the one hand, and enterprises on the other hand. These projects will be conducted within research centres. Jointly undertaken projects by research centres and enterprises will have to encompass at least one SME.

156 projects have been selected for an ERDF amount of 43.471.653€.

Among these, some project portfolios have a direct link with chemical industry or the bio economy:

- Low Carbon Footprint Materials –
- Centre of Excellence in Energy Efficiency and Sustainability
- ECOLISER (ÉCOliants for treatment of soils, Sealants and Roads)
- INTENSE4CHEM
- Mass culture of microalgae and their valorisation for the production of molecules of interest (Algae Factory)
- Tropical Plant Factory

The projects'sheets of the 1st call are currently being finalized.

5.3 “demand pull” research support

This specific objective will adopt an approach based on demand and will characterize mainly by the mechanism of technology vouchers. This will be a support to technological and applied research activities, pilot lines, actions of early validation

of products, advanced manufacturing capabilities and first production in key enabling technologies, and dissemination of technology for general purposes.

This is to encourage SMEs to set up or continue research programs of the type " industrial research" and or "experimental Development" to develop processes, products and new services by apprehending technological capabilities and yield research within research centres.

This measure includes different types of support:

- *Technology vouchers*
- *IP advice vouchers*

The vouchers'budget amounts to 15M€ for 2014-2020.

- *COOTECH*
- *Open mind*

5.4 Support for the implementation of demonstration units for SMEs within the approved research centres

The objective of the measure is the establishment of demonstration units allowing research centres to present their technological capabilities and the products of their research to SMEs. It will allow SMEs to interact with research centres in order to integrate innovation in their processes. These demonstration units will strengthen and professionalize the skills of research institutions in the economic development of their activities and encourage structural links with useful resource centres in this regard.

6 projects have been selected with an ERDF budget of 2.829.371€. The projects'sheets of the 1st call are currently being finalized.

The ERDF balance (9.008.687€) will be used for a second call for projects.

It seems that so far, no project has a direct link with chemical industry or bio economy.

5.5 Financing for innovative enterprises

The aim is to have a larger number of enterprises involved in an innovation process (technological and non-technological) by supporting their own investment in this area thanks to financial instruments.

An ERDF budget of more than 62 mio € has been allocated.

8 financial instruments were selected by the Government end 2015:

- Investments
- Working capital needs
- Start-up
- Take-overs and acquisitions
- Innovative enterprise
- Innovative start-up
- R&D project
- Innovation

Another financial instrument is also available in axis 4 : *Low-carbon measure -Capital, credit and guarantees for businesses, spin-offs and spin-outs*. This is to finance innovative projects in the field of energy or to support new production methods. (ERDF budget:1.115.776,60 €).

5.6 Support for the financing of demonstration or pilot units

It will be launched in 2016.

The objective is to finance demonstrators or pilot units for enterprises or a group of enterprises with a view to bring new products or processes or exploitation of innovation to the market.

6. Governance

6.1 Description of involvement of innovation stakeholders in development and implementation of RIS with focus on chemical related topics

Since 2005, at the launch of the Marshall Plan, Wallonia has revised in depth its economic development policy, based on a so-called “integrated approach to innovation” because it takes into account all stages and components of innovation and secondly, because it promotes and encourages interaction between all innovation stakeholders.

The strategy put in place since 2005, within the framework of the Marshall Plan, and Competitiveness Clusters policy aims to support the development of the productive base, industry at large, including services. Besides, it aims to stimulate the creation of high added-value activities through support to innovation and knowledge transfer.

The implementation of this strategy has resulted in a set of activation measures of the main competitiveness factors in Wallonia: research and promotion of research, innovation at large, ICT, investment and financing, internationalization, networking, entrepreneurship and creativity, infrastructure, skills development,...

Intervention logic was reviewed, mainly through **the competitiveness clusters**. A new Intervention logic called "**bottom-up**" (demand response) completed by the classical "top-down" logic. Now, it means that the dynamics of this policy is up to industrial and research partners which have primary responsibility for the development of their industry by proposing breakthrough innovation collaborative projects. 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.

The other main change sits in the means's concentration. Now, rather than supporting all sectors of activity, new model in place supports **pre-identified areas as carrying on economic and industrial progress for Wallonia**, while allowing **cross-sectoral approach**. The innovation in these areas is well placed in the heart of the industrial policy. This change has resulted in the **establishment of 6 clusters** each specialized in a growth market and innovative, some of which have a global vocation.

The development of the Clusters' policy was based on an academic study identifying priority areas for intervention, based on a comprehensive set of economic and technological criteria, in an international context. This SWOT analysis helped to identify areas of activities in which Wallonia has proven strengths, and in which substantial resources have been and will be invested. The sectors choose themselves to refine their areas of specialization sectors and to define their strategies.

The poles play indeed a key role to play in the implementation of the Walloon S3 strategy, by offering platforms for cross-sectoral collaborations, implementing thematic strategies in line with societal challenges, exploring co-investment possibilities.

A study analyzing the Walloon positioning in the European framework was conducted in 2009 and updated in 2014, on the basis of European Clusters Observatory. Finally it must be stressed that clusters promote a cross-sectoral approach and mobilize industrial and technological potential, based on partnership approach.

The Clusters have contributed to the bottom up process for the development of the regional innovation strategy. Therefore, among the priority areas of Greenwin cluster, we can find green and bio-sourced chemical production. Its priorities also include treatment and reuse of waste and effluents, environmental technologies, waste water management, management and storage of energy, sustainable building and renovation. Besides, regarding Wagralim cluster, its fields of action are sustainable agro-food industry, health and nutritional quality of food, industrial efficiency and packaging. So sustainable chemical production and bio-based economy are included in the priority areas of action.

Concerning the companies and R&d stakeholders, they are numerous in the different layers of regional governance of the innovation system but the creation of the Enterprise and Innovation Agency in 2015 and the Academy of Research and Education was a recent improvement. The competitiveness poles have initiated a positive cross-poles collaboration dynamic that fosters synergies between the different areas. They also integrate the different stakeholders of their specific domains within the governance structures.

6.2 Description of established structures and stakeholders

Walloon stakeholders in the chemical and bio-economy sectors are involved in the process of deepening of the S3. And, through a continuous process of consultation and discussion with the administration, particularly on the opportunities for European funding and refinement about their positioning. In addition, a monitoring group bringing together these stakeholders, was created following the selection of Wallonia by the European Commission, as a Model Demonstrator Region for sustainable chemical production (COSME project). The ambition is to develop a strategic roadmap and a financing plan for Wallonia. The Public Service of Wallonia has the objective to link the 2 projects by exchanging information, good practices, etc for more efficiency.

Clusters are great platforms to develop joint innovative projects because they disseminate information but also to bring together companies and research institutes

into triple helix cooperation. Moreover, these stakeholders have already been working together on projects like Le Coq Vert, which aims to establish a competitive bio-based economy in Wallonia. As a result they know each other and more importantly, know how to work together.

The Public Service of Wallonia work closely together with these Walloon stakeholders in the field of sustainable chemical production:

- GreenWin : Competitiveness cluster dedicated to the green economy, green chemistry and sustainable development
- PLASTIWIN : cluster in the plastics industry.
- Essenscia Wallonie : federation of the chemical and life sciences
- Cefochim : Training centre in the Chemical and Pharmaceutical sectors

- Walloon Agency for Enterprise and Innovation (AEI) : offers support services to Walloon companies in the areas of economic, technological and digital development
- BLOWIN : Health competitiveness cluster
- Wagralim : cluster of agribusiness
- Certech: Technological Resource Centre in chemistry
- Valbiom: Biomass valorization organisation
- ...

The selection procedures for Clusters and projects submitted by Clusters are based on external expertise via an independent selection board. Clusters also have established internal panels to ensure the quality of the emergence process of projects. The Clusters policy therefore is continuously monitored through the Marshall Plan's monitoring, but also by the administration in charge of coordinating this policy (Competitiveness and Innovation Department) and by the international jury which evaluate Clusters projects and strategies and regularly make recommendations.

More generally, the Wallonia RDI policy is evaluated every two years by the Council of scientific Policy. This is based on an analysis of the Walloon research and innovation system as well as on a statement of public expenditure in R & D and policies in this area over the past two years in Wallonia.

7. Current Challenges for implementation of RIS and expectations to interregional learning

There is will to ensure full consistency of the regional smart specialization strategy with research and economic policy, technological and non-technological innovation, including eco-innovation, and considering ecosystems.

The implementation of the smart specialization strategy encounters some challenges:

- The need to implement new initiatives and / or to get them coherent in order to continue deepening of the strategy in the field of chemical production, as a dynamic and evolving process;
- Overcoming resistance to change of some actors facing a long-term process which is taking place gradually;
- Developing an effective policy mix supporting technological and non-technological innovation in the chemical sector and stimulating private sector investment.
- Involving more SMEs into the Clusters dynamics and stimulating innovative entrepreneurship, especially in the field of circular economy and the bio-economy

Through this project of interregional exchange of experience and mutual learning between public authorities from seven European chemical regions, Wallonia hopes to:

- Change both the tools and the operation mode of all the actors of the regional innovation system by pulsing and enhancing collaborative new dynamics and interaction between stakeholders in the chemical sector.

- Learn how to further promote bottom-up approach to identify specialized niches of Clusters in the field of chemistry and bio-economy through the stimulation of entrepreneurial discovery process.
 - mobilize regional stakeholders in the field of chemistry and ensure their full involvement on a partnership basis
 - Establish systematic interactions with stakeholders to enable transversality
 - Develop the internationalization of clusters through an improved articulation with EU programs, greater involvement In the EU networks and bilateral and interregional cooperation targeting.
 - Wallonia needs an integrated and holistic approach taking into account its strengths and potentials in the European context, as well as opportunities from European programmes and networks.
-
- Learn how to answer the challenges of the industry described earlier: strong competitive pressure, shortage of trained scientific and technical personnel, the multiple legislative standards, ...
 - Learn how to develop the bio economy and the biomass potential, along with the Model demonstrator Region project.