



European Union
European Regional
Development Fund

Smart Chemistry Specialisation Strategy

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

October 2016

Table of Content

1. Description of Partner Region	5
1.1 General Description	5
1.2 Economic Indicators.....	5
1.3 Challenges for the region	7
2. Description of chemical / bioeconomy industry.....	15
2.1 General Description	15
2.2 Indicators (Focus on NACE Code 20 Chemical Industry and 22 Plastic Industry)	16
2.3 Challenges for the industry	22
3. Description of Regional Innovation Strategy.....	26
3.1 General Description, Challenges and Objectives	26
3.2 Focus on chemistry / bioeconomy, etc. – highlight thematic priorities.....	30
4. Description of ERDF Operational Programme.....	32
4.1 General Structure.....	32
4.2 Responsible Bodies	33
4.3 Priority Axes and Available Funding.....	34
5. Description of Funding programmes	41
5.1 RIS3CAT Communities	41
5.2 R&D Cooperation Projects	43
5.3 Innovation Vouchers	46
5.4 TECNIOspring plus	47
6. Governance	49
6.1 Description of involvement of innovation stakeholders in development and implementation of RIS with focus on chemical related topics	49
6.2 Description of established structures and stakeholders.....	51
7. Current Challenges for implementation of RIS and expectations to interregional learning ..	57

List of Tables

Table 1: Key Economic Date.....	5
Table 2: Gross Value Added 2015	6
Table 3: Main data chemical industries Catalonia 2014.....	17
Table 4: Overview of responsible bodies.....	33
Table 5: Financial breakdown for each priority axes.....	36
Table 6: Result indicators related to specific objectives.....	40
Table 7: Overview aid intensity.....	45
Table 8: Catalan Stakeholders Proposal	56

List of Figures

Figure 1: Catalonia in Europe.....	5
Figure 2: The chemical sector in Europe	15
Figure 3: Turnover and Workforce chemical industry Catalonia.....	16
Figure 4: Evolution main data for chemical sector in Catalonia	18
Figure 5: Distribution of turnovers by subsectors.....	19
Figure 6: Distribution of Workforce by subsectors	20
Figure 7: Evolution of Chemical, Petrol and Rubber Foreign Trade.....	20
Figure 8: R&D Chemical Sector in Catalonia.....	21
Figure 9: Macro Environment Factors for Sector Strategy	22
Figure 10: RIS3CAT General Scheme	28
Figure 11: RIS3CAT Leading Sectors	29
Figure 12: Cross-cutting enabling technologies.....	30
Figure 13: Logo Comunitats RIS3CAT	41
Figure 14: Logo R&D Cooperation Projects	43
Figure 15: Logo Innovation Vouchers.....	46
Figure 16: Logo TECNIOspring plus	47
Figure 17: Process of drafting RIS3CAT	49

1. Description of Partner Region

1.1 General Description

Catalonia is one of the densest regions in Europe. With a surface area equivalent to 0.7% of EU, it has the 1.5% of the EU population (7, 5 million inhabitants) and a GDP per capita of 27,833€ (total GDP 214,900 M€ (data corresponding to 2014)).



Figure 1: Catalonia in Europe

Catalonia is a diverse territory, with extensive mountains, inland depressions, and a coastline that stretches for 214 km. Winters are mild and summers are dry. Its location in the Mediterranean and its transport infrastructures, as well as its trading, entrepreneurial and open economy have made it a top rank strategic position in the south of Europe.

1.2 Economic Indicators

Catalonia also has a diverse and dynamic industrial economy predominantly with SMEs, where industry contributes to 20% of the Catalan Gross Value Added.

The industrial activity, has grown particularly in the Barcelona area, but it has also developed in many industrial cities all over the country. Half of the Catalan economy has either a direct or indirect relationship with the industrial sector, innovative, dynamic and diversified.

Together with industry, trade and tourism are important activities. Tourism has increased in such a way that it has become one of the most notable economic activities of Catalonia.

Among industry, food industry, chemical products and energy industries make the most contribution to the industrial turnover. Up to 29% of industrial employees work in the food sector while about 12% of industrial employees work in the chemical industry. Chemical industry is diversified and includes pharma, cosmetics, refining, energy and speciality chemical products.

Key Economic Data 2015	
Population:	7.5 million
Area:	32,106 Km2
GDP (2015):	214.9 billion Euro
GDP per capita (2014):	27,833 Euro
Exports (2015):	63.8 billion Euro
R&D:	1.5% of GDP
FDI (2015):	4.783 million Euro

Table 1: Key Economic Data
Source: Catalonia Trade & Invest

According to data published by the State's Ministry of Economy and Competiveness, foreign investment in Catalonia grew 57.8% in 2015, reaching a total of 4,783 million euros, the second highest figure on record, only surpassed by the 2010 figures. Catalonia concentrates 22% of all investments in Spain. Catalan exports grew by 6.1%, generating a record breaking 63.8 billion euros for the economy. This increase is largely attributed to 3% rise in the number of regular exporting businesses in Catalonia (16.422 companies) and represents 34.4% of the Spanish state's total. Catalan exports represented 25.5% of all of Spanish exports for 2015.

Industrial Gross Value Added 2015	
13.32 %	Food
10.28 %	Chemicals
9.73 %	Motor vehicles
9.37 %	Energy
8.79 %	Pharma
7.49 %	Metal (except machinery)
5.73 %	Water Supply & Waste
5.09 %	Paper
4.71 %	Machinery
4.51 %	Plastic
4.23 %	Textile & Fashion
3.54 %	Electric & Electronics
13.21 %	Other
Industry's total GDP 2015:	€ 38,754 M

Table 2: Gross Value Added 2015
Source: Catalonia Trade & Investment

1.3 Challenges for the region

Catalonia, like other European countries must face major challenges, in both the short and long terms. The immediate priority is a return to growth and job creation, whilst the mid- and long-term challenges include increasing global competition, population ageing, climate change and pressure on resources.

A summary of the main strengths and opportunities of the Catalan economy and sectors that, due to their importance and potential, may act as the cornerstones for economic recovery and guiding the Catalan economy towards a smarter, more sustainable and more inclusive growth mode.

SWOT of the Catalan economy

Internationalisation

Strengths

- High degree of openness of the Catalan economy.
- Exports performing well.
- Growing number of Catalan industrial multinationals.
- Significant presence of companies with foreign capital, particularly around Barcelona. Barcelona is one of the world's most attractive cities for foreign investment, organising international congresses and attracting international students for MBA courses.

Weaknesses

- Catalan exports are concentrated in the mature markets of the EU (66.5%), which have limited growth potential.
- Large companies and multinationals concentrate a high percentage of exports.
- The sectors of motor vehicles and chemical concentrate 41%.
- From outside Spain loses credibility as a country and its policies.
- The insufficient knowledge of foreign languages and the small size of the company Catalan limit the potential for internationalization of Catalan companies.
- Significant gaps in major transport infrastructure.

Opportunities

- Large multinational companies choose Barcelona as the platform for establishing and developing businesses and networks of innovation, and as a centre for managing business in southern Europe and the Mediterranean area.

- Demand is growing in emerging countries for products and services in which Catalonia has important competitive advantages (tourism, food and drink, health, design, etc.).
- Catalonia's optimal geostrategic position as a connector between the European and Asian economies is key to business competitiveness. The development of the Mediterranean rail corridor opens up opportunities for attracting goods traffic from Asia and destined for Europe.

Threats

- Growing competition from emerging countries to attract foreign investment. Europe (especially southern countries) lost centrality.
- The uncertain political and economic situation in Spain, the perception of Spain as a market without growth prospects in the medium term and the bad image of the Spanish economy showing international media can affect decisions' multinational investment location.
- There is a risk of relocation of business activities, especially in sectors and low value-added activities.

Research and innovation system

Strengths

- With 1.5% of the EU-27 population, Catalonia generates 2.9% of scientific publications, receives 2.2% of funds allocated under the Seventh Framework Programme for Research and attracts 3.29% of European Research Council projects (Catalonia is the third-most important EU country by number of projects per million inhabitants). With 0.1% of the world population, Catalonia produces 1% of scientific publications.
- Catalonia has an important network of centres for the generation and application of knowledge (12 universities and 3 of the top 25 business schools in Europe). This network generates a significant critical mass of qualified and highly valued professionals in the world of employment and science. There are also hospitals and research centres with great international prestige in the fields of science and knowledge transfer.
- Over the last twenty years, stable public policies have been agreed in Catalonia, reflecting political commitment to R&D.

- The ICREA programme is a successful model, recognised internationally, for attracting and retaining talent.
- Catalonia has scientific and technological infrastructure that enjoys great international prestige (the National Centre for Genome Analysis, the Alba Synchrotron and the Barcelona Supercomputing Centre).
- Catalonia's R&D&I is sufficiently competitive to meet new challenges and play a role in major scientific and technological projects in the future.
- Incentives are provided for the concentration and consolidation of research stakeholders in order to increase critical mass and competitiveness.
- Catalonia's highly developed network of technology centres is gradually gaining position in European and international platforms and projects.
- There are many collaborative initiatives amongst research and innovation system stakeholders.
- Catalonia and, especially, Barcelona, are internationally renowned for design and creativity, important assets for the Catalan innovation system.
- Barcelona is the world mobile capital and, in 2014, European capital of innovation.

Weaknesses

- The economic crisis has halted the rising trend of public and private investment in R & D, which is necessary to consolidate the Catalan R & D. The effort on R & D stood at 1.65% of GDP in 2010, still far from the target of 3% set in the Europe 2020 strategy.
- Catalonia has not enough ability to make decisions in key areas for research and innovation. There is little coordination between policies and instruments for R + D + I in Catalonia and Spain.
- The production of patents is significantly lower than the European average
- Lack a culture of cooperation between the companies and other agents of the research and innovation. SMEs often have low absorptive capacity of knowledge and don't have qualified staff to develop R & D or to exploit R & D outsourcing.
- There is little relationship between universities and business, and mobility of researchers between the public and private sectors is low. The relationship between universities, research centers and companies is insufficient.
- The Catalan universities have a limited presence in the top rankings of the best universities in the world.

- The potential purchase and public investment as a driver of innovation strategy is underdeveloped.
- There is little capital investor willing to take risks in knowledge-intensive business projects, especially in the early stages of expansion.

Opportunities

- R&D&I processes are becoming increasingly global and open. The Catalan R&D system occupies a good position: it is a centre of attraction for researchers of international prestige and is fully interconnected with European networks and platforms (strong presence in framework research programmes and ERC funding, participation in both regional organisations such as the Four Motors for Europe and the Working Community of the Pyrenees) and international networks (stable research and innovation cooperation with Israel, Massachusetts, USA, Quebec, Canada, and Santa Catarina, Brazil).

Threats

- The economic crisis and the contention of public spending are threatening economic sustainability of the R & D financed mainly by public funds.
- As part of the strategies for smart specialization, countries and regions seeking ways to improve the scientific and technological positioning in niches that have the most potential for the future. There is the risk of not excel in anything due to a lack of capacity to focus on scientific and technological areas in which Catalonia has a competitive advantage.

Business system

Strengths

- The industrial sector represents 19.3% of GDP.
- Catalonia has a long industrial tradition: this was one of few southern European regions that took part in the industrial revolution.
- Catalan industry is highly diversified and is devoted, basically, to processing.

- There are a growing number of large and medium-sized enterprises with successful strategies and potential to become leaders.
- Catalonia is a pioneering region and an international reference for cluster policies. The production sector is divided into territorial clusters, which are the object of public and private initiatives to strengthen their competitiveness and foster cooperation.

Weaknesses

- During the last decade the industry has lost weight in the Catalan GDP and in the employment at a rate higher than the European average.
- The growth model during the years prior to the crisis, based on the extensive use of employment and growth in domestic demand, slowed productivity and adaptation of the production process to the new global environment.
- In the Catalan business fabric there is a strong presence of companies without employees and microenterprises.
- The Catalan capital of global companies with sufficient dimension to compete with large multinationals are rare.
- • The participation of large companies in cluster initiatives is limited.
- The subsidiaries of foreign multinationals have a high dependence on decision centres outside Catalonia.
- The concentration of exports in a few sectors and in multinational companies is high.

Opportunities

- As a result of rising transport costs, energy prices and demand for customised and local products and services, labour costs become less important as a competitive factor than externalities generated by presence in an innovative environment that enables cooperation with specialised suppliers, technology centres, engineering and design firms and other qualified services and users with the goal of developing innovative and customised solutions.
- Europe 2020 is committed to industry, ICT and enabling technologies as drivers for change. Catalonia has a wide industrial base and in recent years has established an extensive network of research and technology centres that are highly competent in the

ICTs and the enabling technologies, and which has high potential to develop applications for Catalan industry.

- The capacity to generate social experiences and networks has become a key factor in competitiveness because, more and more, European consumers want new and enriching experiences. In this context, creativity and design become key for transforming ideas into products and services that will be attractive to the market.
- The transition to a green, low carbon, low energy intensity economy that is resilient to climate change generates new opportunities for economic activity and job creation, especially in the field of efficient use of resources and sustainable urban development (“smart city”), a field in which Barcelona and other cities in Catalonia occupy an excellent position and have become international benchmarks.

Threats

- The increase in the cost of transport, the demand for sustainable products, the increase in prices of energy and raw materials, the reduced production cycles and the demand for customized products and services require companies to strategically reorient.
- The extension of the crisis and difficulties of access to credit and alternative sources of financing difficult for companies carrying out the strategic changes necessary to be competitive in the global market.
- The departure of young talent abroad due to the lack of perspectives of finding a job in Catalonia will cause a shortage of professional profiles necessary for the strategic reorientation of the business.

Environment

Strengths

- The strategies that Catalonia and Barcelona implement to attract foreign investment have become international references.
- In recent years, significant progress has been made in simplifying the legislative framework and regulatory procedures that affect businesses (the one-stop business window, reducing the number of days required to start a business, and the Omnibus laws).

- There is an extensive public-private network of public support for entrepreneurship (agencies, incubators, entrepreneurial support services, etc.).
- The Catalan economy is immersed in intense transformation based on private sector restructuring, public finance strengthening, price adjustment and reallocating productive factors.
- The contribution of voluntary organisations to the cohesion and structure of society has made Catalonia a European reference point. Similarly, Catalonia has always been a destination for immigrants. Policies to promote integration and equal opportunities have enabled these newcomers to play active role in Catalonia's development and the construction of an inclusive society.

Weaknesses

- The rigidities and obstacles of the institutional environment and market, as well as certain social and cultural factors, limiting the size of Catalan companies.
- Access to finance, particularly for SMEs, is not always easy.
- The access to the capital is a key factor to facilitate business operations, internationalization and adoption of innovations.
- In the university governance system is rigid; funding research inadequate and knowledge valorisation system and technology transfer are inefficient.
- The education system is not very flexible and adapts slowly to societal changes.
- Vocational training is not attractive for young people or not responding to the needs of businesses. In Catalonia there is a lack of intermediate technical professionals who are essential to the development of the business.
- The high school dropout rates and high unemployment limit career opportunities and imply an unacceptable loss of human capital and talent for the country.

Opportunities

- Increasing life expectancy and population ageing generate growing demand for health services to ensure good quality of life for citizens of all ages (availability of wider range of health services and facilities and more sophisticated diagnostic procedures, treatments and therapies). Medical tourism is a growing phenomenon worldwide and is one of the key pillars in the international growth of the Catalan health industry. The Catalan healthcare sector is internationally renowned as a unique model and, above

all, for its management of health services and primary care, as well as for training and applied R&D.

- Rising life expectancy and population ageing also generate increased demand for social care, especially in the fields of promoting personal self-dependency and care for dependant people. Accordingly, social services are an important economic sector in the Catalan economy as a whole, one that has a very direct effect on employment.
- Today more than ever, the great social challenges require social innovation. Catalonia has a long-standing tradition in the social economy and civil society, which promote innovative entrepreneurial initiatives aimed at providing solutions to social problems.
- The great potential for development and application presented by the energy efficiency and saving technologies will generate new opportunities for economic activity globally. The development of potential renewable energy resources in Catalonia will reduce energy dependence on imports of fossil fuels.

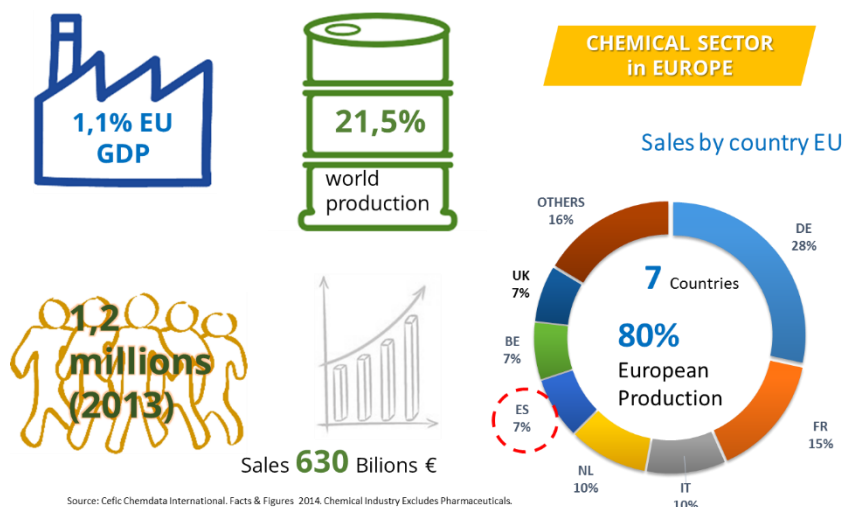
Threats

- The economic crisis and the contention of public expenditure needed to reduce public debt jeopardize the sustainability of health systems and social assistance, in a context of increasing life expectancy, aging population and social needs (for high unemployment and increasing poverty) play increasing pressure on public spending.
- Budget restrictions also hinder the adaptation of the education system to current and future challenges.
- Catalonia has no significant fossil energy resources

2. Description of chemical / bioeconomy industry

2.1 General Description

World chemicals turnover was valued at €3,232 billion in 2014. Global sales grew by 2.6% in 2014, this growth rate was considerable lower compared to the 10 years trend, when average annual sales expanded by nearly 9.0% from 2003 to 2013. World chemicals sales is largely driven by China, EU chemical industry ranks second, along with United States.



During the period from 2004 to 2014, the European Union gradually lost its top spot in chemicals sales to China.

Figure 2: The chemical sector in Europe
Source: Cefic

The European Chemical industry continues to be a world leader, and a highly innovative sector.

The chemical industry has a long tradition in Europe and is part of the value chain of almost all industrial systems. It supplies raw materials for various products, it allows the development of advanced materials and it contributes to the improvement of food, hygiene and health. In addition, thanks to the technological valorisation, chemistry favours the reuse, the recovery and the production of value added products.

The Business Federation of the Spanish Chemical Industry (FEIQUE) forecasts the Spanish chemical sector will register a growth in its turnover in 2015 of 3.5%. Currently, the chemical activity of production enterprises based in Catalonia represents nearly 40% of the Spanish activity, and Catalan production weight in relation to the EU 28 is 3.1%.

Additionally, the Catalan industrial chemical sector turnover is 16.597.931 Thou €, and comprises a total of 806 enterprises with 30.667 employees. The staff employed in the chemical industry is more qualified and better trained than other industries, and is characterized by high productivity, according to FEIQUE. Moreover, the chemical sector has a tractor effect over other sectors, such as automotive, adhesives, plastics, materials, textile, health, etc.

But if we consider also the annexes chemical sectors as pharmaceuticals and plastics manufacturing, the number of companies reaches the 2,050 with 27,917 million euro turnover and more than 69,000 employees.

It is worth to highlight that the Catalan chemical sector is characterized for its continuous effort to integrate innovative and new technological developments and work with high standards of environmental sustainability, which includes the concept of green chemistry. For instance, the sector has joined the Responsible Care Initiative, the chemical industry global initiative to drive

on-going improvement and achieve excellence in environmental, health, safety and security performance.

Catalan Chemical sector is composed by multinational enterprises and very dynamic and innovative SMEs, besides training centres, research institutions and other knowledge providers, both public and private (8 universities; near 100 research groups; 2 public research institutions: ICIQ and CSIC, among others). The crisis has affected a sector which had become the Southern Europe Chemical Hub: between 2008 and 2013 5,951 jobs were destroyed only in the Chemical sector in Catalonia, and the manufacturing industry has lost more than 7 percentage points of weight in terms of GVA in Catalonia. Therefore it is crucial to design new strategies to increase the competitiveness of the chemical enterprises, seeking new processes and materials and creating new and more qualified jobs. Decision-makers and stakeholders are looking forward for reviving and strengthening the chemistry sector in the region.

Positively the Catalan chemical industry is very dynamic and representatives are present in key platforms such as Bio-Based Industries (BBI) SPIRE or FOF. The recently created Cluster Med Chem (industrial, logistical, academic and scientific chemical cluster), the Catalan Biomass Cluster, as well as Advanced materials Cluster and Barcelona Beauty Cluster are also valuable platforms for continuous improvement and strengthening synergies for Catalan enterprises.

2.2 Indicators (Focus on NACE Code 20 Chemical Industry and 22 Plastic Industry)

Despite having suffered the economic crisis, there has been a change of tendency in 2014.

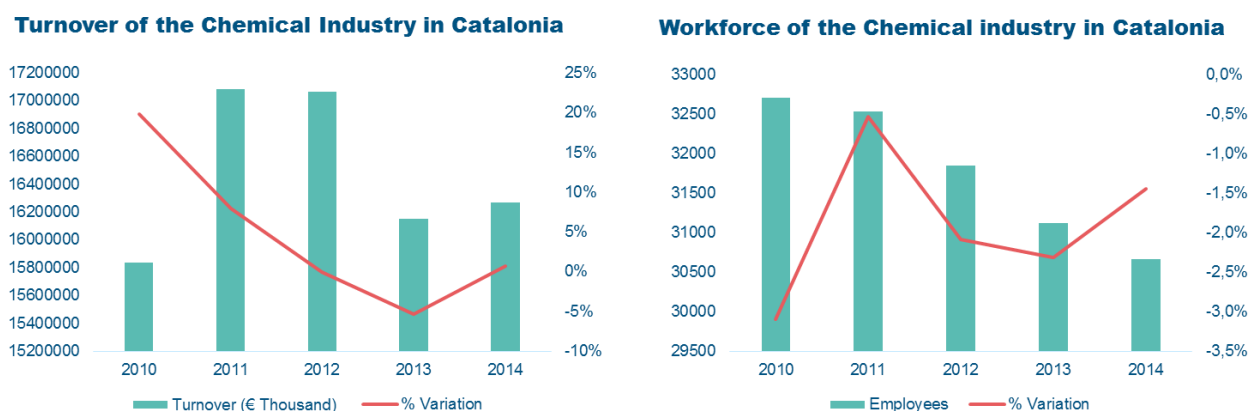


Figure 3: Turnover and Workforce chemical industry Catalonia

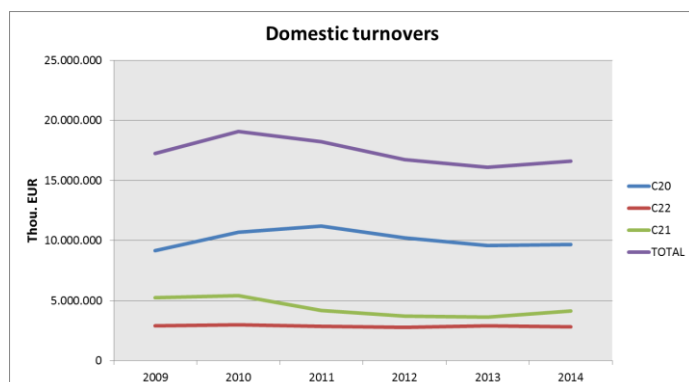
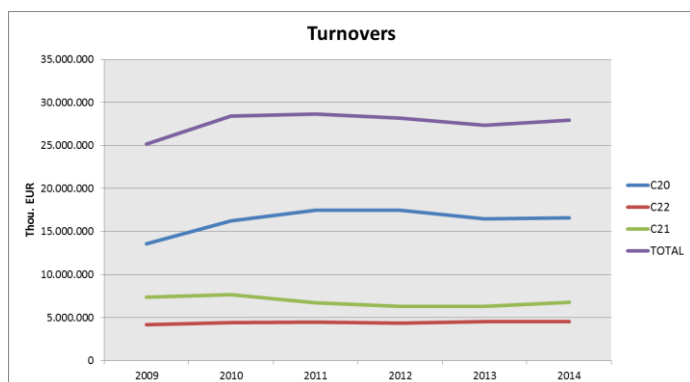
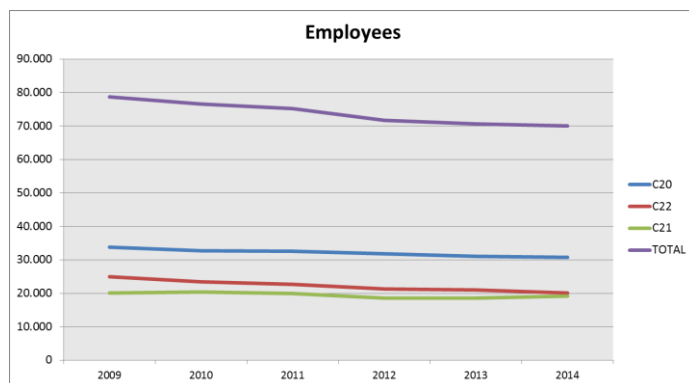
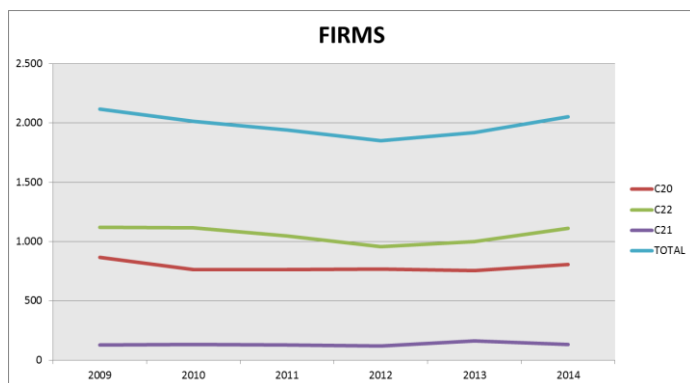
Source: IDESCAT (Statistics Agency of the Government of Catalonia). Chemical Industry Excludes Pharmaceuticals

Main data of the chemicals, pharmaceuticals and plastics industry in Catalonia 2014

	20 - Chemistry	21 - Pharmaceuticals	22 - Plastics	Total 20 +21 +22
Firms	806	132	1.112	2.050
Turnovers (Thou. EUR)	16.597.931	6.776.431	4.543.336	27.917.698
Employees	30.667	19.211	20.099	69.977
VAB (Thou. EUR)	3.007.911	2.571.279	1.318.718	6.897.908
Foreign turnovers	6.919.789	2.638.078	1.745.427	11.303.294

Table 3: Main data chemical industries Catalonia 2014
Source: Idescat amb dades de l'Enquesta Industrial d'Empreses

Evolution of the main figures in the chemical sector, including plastics and pharmacy, in Catalonia in the last 5 years



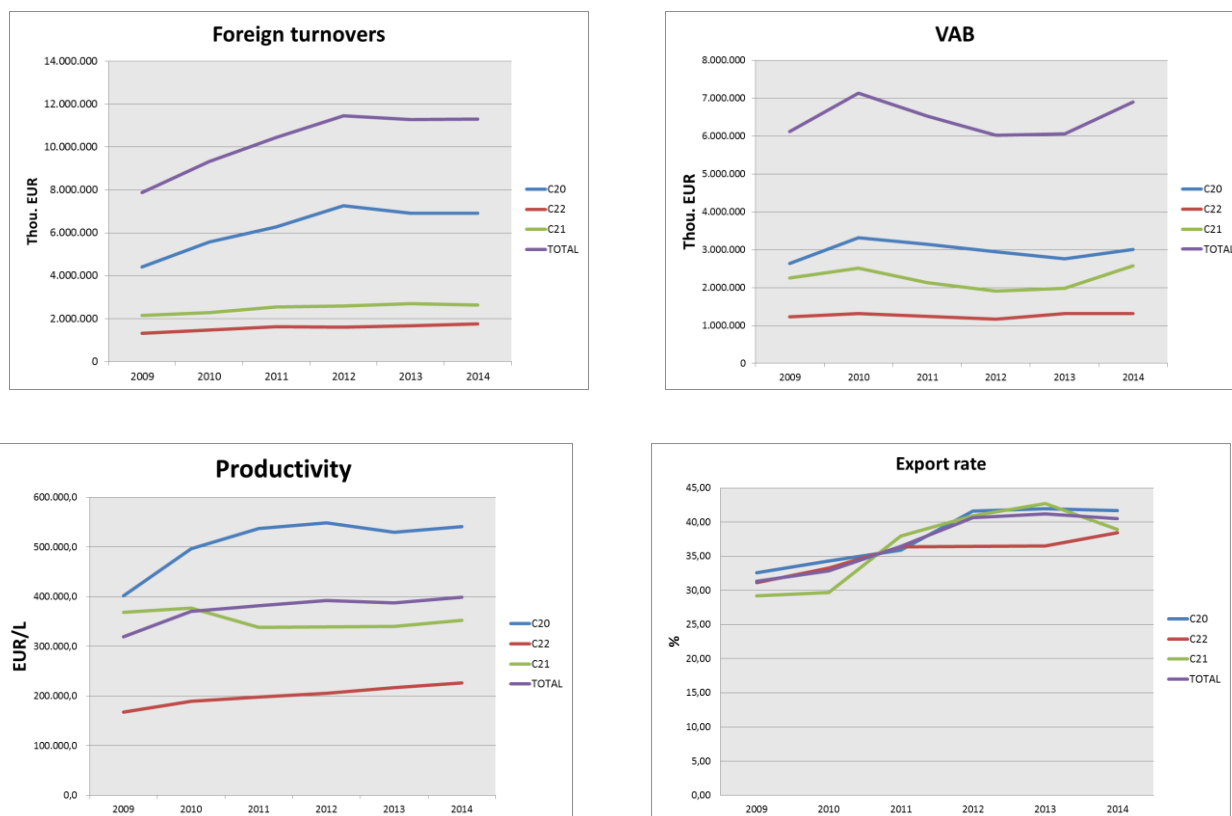


Figure 4: Evolution main data for chemical sector in Catalonia
Source: Idescat amb dades de l'Enquesta Industrial d'Empreses

The economic crisis of the year 2009 has been noticed in the Catalan chemical industry especially in the cessation of business. Over 250 companies closed in the period from 2009 to 2012.

Despite having suffered the economic crisis, there has been a change of tendency in 2014.

The turnover of chemical industries holds the crisis of 2009, but in 2013 a general decline was noted. In the case of pharmaceutical industries the crisis was noted since 2010. The plastics industry has remained stable over 5 years. In employees is where more has noticed the crisis, with a continued decline of the workforce dedicated to the chemical sector, many jobs lost, near 10.000 from 2009 to 2014.

The pharmaceutical industry is the one that has best withstood the crisis and it seems that recovers the capacity to create jobs.

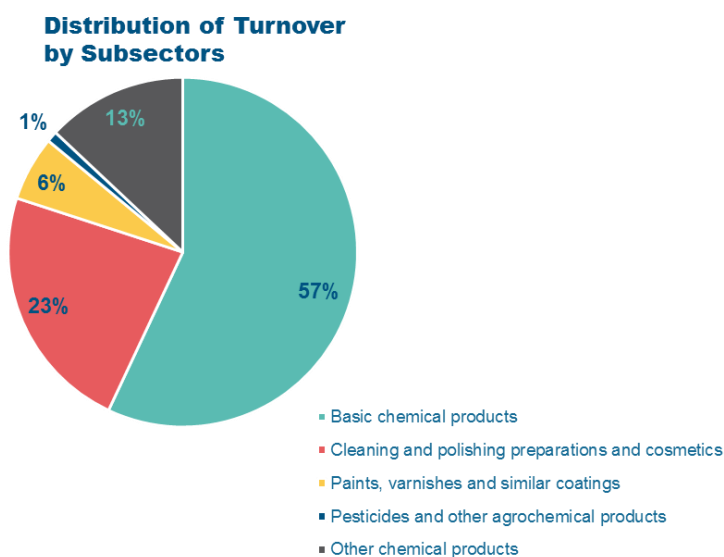
Noteworthy is the behavior of domestic sales and exports. While turnover in the domestic market decreased from 2010, exports increase.

Productivity begins to increase especially in the manufacturing of chemicals and plastics.

Export rate is over 40%. Highlights the pharmaceutical sector decline, mainly due to the completion of patents and the emergence of biotech products.

The trend of value added in all sectors is positive.

Basic chemicals is the main subsector in Catalonia its turnover being around 57%, followed by Cleaning and Polishing preparations and Cosmetics (23%)

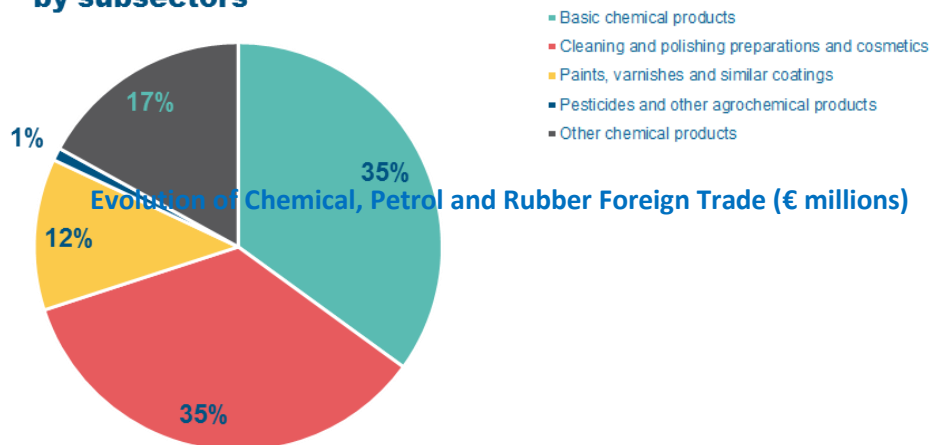


Source: Informe anual sobre la indústria a Catalunya, 2014, 2013 data (Yearly Catalan Industry Report, 2014). Chemical Industry Excludes Pharmaceuticals.

Figure 5: Distribution of turnovers by subsectors
Source: Yearly Catalan Industry Report, 2014

Basic chemicals and Cleaning and Polishing preparations and Cosmetics are the main subsectors in Catalonia by employment, accounting for 70% of the Workforce.

Distribution of Workforce by subsectors



Source: Informe anual sobre la indústria a Catalunya, 2014, 2013 data (Yearly Catalan Industry Report, 2014). Chemical Industry Excludes Pharmaceuticals.

Figure 6: Distribution of Workforce by subsectors

Source: Yearly Catalan Industry Report, 2014

Regarding foreign trade, 22.2% of Catalan exports has come from the Chemical Sector and 34.7% of Spanish chemical exports has been Catalan.

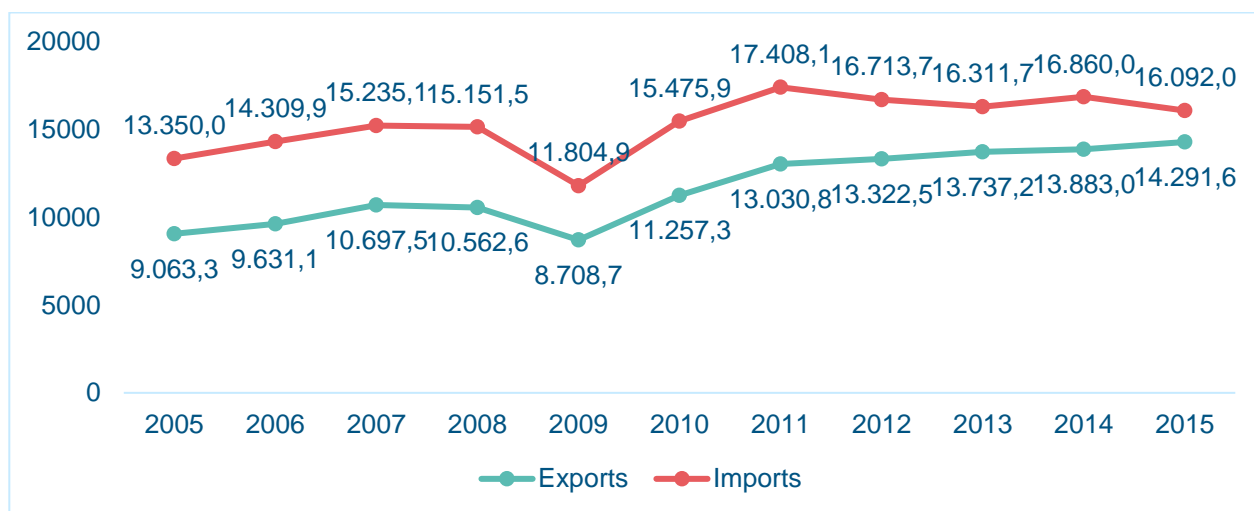
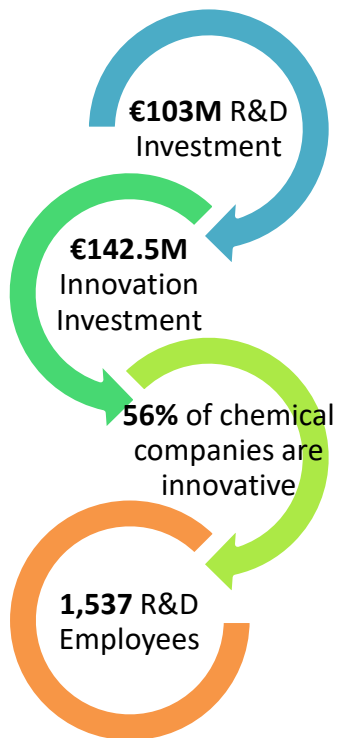


Figure 7: Evolution of Chemical, Petrol and Rubber Foreign Trade

Source: Idescat amb dades de l'Enquesta Industrial d'Empreses



With regard to research, development and innovation, we can highlight that the chemical sector accounts for 44% of total investment in R + D in Spain.

The chemical sector in Catalonia makes an investment in R & D of over 100 million euros, and more than 142 million euros in innovation activities. In addition 56% of Catalan chemical companies are innovative and employ more than 1,500 workers directly related to research, development and innovation.

Figure 8: R&D Chemical Sector in Catalonia
Source: Yearly Catalan Industry Report, 2014

2.3 Challenges for the industry

A PESTEL analysis has been made to describe the macro environment factors to be taken into account in the sector strategy.

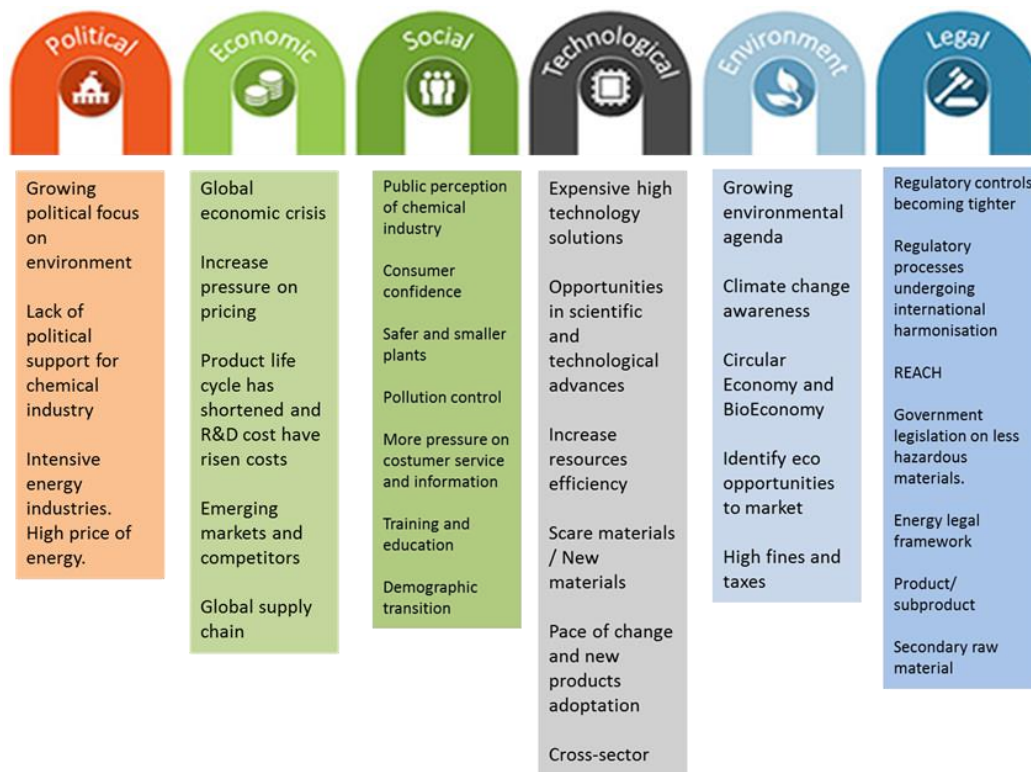


Figure 9: Macro Environment Factors for Sector Strategy

Source: Own elaboration based on working group task

Catalonia has the necessary elements to become a powerful chemical region at the forefront of new technologies and sustainable business models. A SWOT analysis is hereby provided.

Catalonia has the necessary elements to become a powerful chemical region at the forefront of new technologies and sustainable business models. A SWOT analysis is hereby provided.

STRENGTHS CATALONIA CHEMICAL SECTOR

Industrials:

- Powerful and diverse chemical sector and related sectors. Long tradition
- Mature and diversified industrial sector, consolidated across the value chain
- High Productivity.
- High level of specialization
- Tarragona holds the largest Chemical Industry Hub in Spain.
- Very powerful sector of basic chemistry, fine and specialty chemicals (API, flavour and fragrances, dyes, pigments ...)
- Existence of a support fabric, laboratories, etc.

- Innovative sector

Academic:

- Strong scientific capacity in chemical and material science research both at universities and research centers.
- Catalan universities offer 53 Bachelors' or Masters' Degrees in Chemistry or related fields
- Expertise in biotechnology, bioprocess engineering, biomass processing, materials science and chemistry, among others.

Raw materials:

- High efficiency in energy using.
- Increasing use of waste from agricultural, forestry, and industrial.

Other:

- Alignment with RIS3CAT strategy aimed at improving the economy and reorient the productive sector.
- Availability of skilled labour.
- Territory with infrastructures to set up chemical companies: supply and logistic services and communication network (except for railway).

WEAKNESSES CATALONIA CHEMICAL SECTOR

Industrials:

- Loss of weight and industrial jobs
- High % of manufacturers of basic chemicals
- Slight incorporation of biotechnology in industrial sector
- Business fabric comprised of industrial SMEs and large multinational firms with decision centres outside Catalonia
- SME Business Fabric without organization and not strong enough to face new challenges and risks

Academic:

- Research mainly focuses on life sciences/health
- Low interaction with industry
- system of research funding
- Limited track record and success stories in licensing of academy generated technologies and spin off creation (compared with other countries)
- Lack of official and homogeneous recognition of technology transfer activities as part of a researcher's CV
- Funding for valorisation and development of technologies is very low, and programs very focused in Health, while other chemical technologies require high investments too

Raw materials:

- Dependence on raw materials from abroad.
- Risk of supply of critical materials
- Forest resources are limited. And under drought due to seasonality and the Mediterranean climate.

Others:

- Limited funding
- Lack of infrastructure for development and scaling –up processes
- Lack of railway network (Rail Mediterranean Corridor)
- High price of energy (electricity and water). Spanish energy policy
- Limitations of the Spanish legal framework
- Public image of chemistry

OPPORTUNITIES CATALONIA CHEMICAL SECTOR

Industrials:

- Cross-sector. Chemistry forms part of the value chain of many other industrial systems.
- High industrial application of bio-economy
- Reformulating the chemical oil refineries to new process based on bio-economy
- Attracting new enterprises to invest in Catalonia
- Creation of new spin-off, as well as the growth and consolidation of existing
- Building a new niche market
- Circular Economy implementation

Academic:

- Science knowledge-based
- Opportunity to develop new knowledge in process like bio-catalysis, fermentation, algae, synthetic biology, metabolic engineering, capture CO₂ ...
- Consolidating the academic experience bio-economy to position Catalonia as a benchmark of excellence
- Creation of new collaborative projects with industry

Raw materials:

- Diversification raw materials
- Opportunity to develop bio refineries to produce not only energy products but also other precursors and added value products, plastic, etc.
- CO₂ capture and recovery as an alternative to fossil fuels
- Landfill mining
- Smart materials

Others:

- Chemistry can help set the basis for sustainable progress
- Cross-sectorial projects
- Opportunity to train professional profiles to meet demands of the sector
- Creation of skilled jobs in the region
- Mediterranean corridor

THREATS CATALONIA CHEMICAL SECTOR

Industrials:

- Low carbon economy
- New supply chain
- Difficulty to attract industries and traditional (chemical, pharmaceutical, textile, ...) in the bio-economy, and new chemistry
- Lack of a comprehensive and coordinated strategy

Academic:

- Lack of funding to develop new projects and infrastructure
- Lack global transfer model academia to industry

Raw materials:

- New materials
- Scarc materials
- Lack of Supply Security

Others:

- Low capacity to attract talent that can limit the development of the sector
- Image
- New EC Directives could contribute to the loss of chemical companies
- legislative and regulatory policies
- Resources and funding

3. Description of Regional Innovation Strategy

3.1 General Description, Challenges and Objectives

Catalonia has adopted Europe 2020 priorities through the Catalonia 2020 Strategy (ECAT 2020), which is the Catalan Government's roadmap for relaunching the economy and reorienting the production sector towards a smarter, more sustainable and more inclusive economic model.

ECAT 2020 sets out a series of public policies aimed at improving competitiveness and creating employment. The strategy focuses particularly on measures that have a direct and quantifiable impact on priority areas: employment and training, social cohesion, innovation and knowledge, entrepreneurship, internationalisation and the green economy.

Within the ECAT 2020 framework and based on a shared vision of the country towards the year 2020, RIS3CAT promotes:

- **R&I** as a driver for the economic transformation of the production system towards a competitive and sustainable model that fosters employment and social cohesion.
- **Cooperation** amongst the quadruple helix stakeholders to generate new opportunities for the creation of wealth and employment and to provide a response to the challenges facing society.

In a context characterised by public spending restraints, in order to respond to new social, economic and environmental challenges the Administration needs to change its way of doing things. Government needs to base its actions on criteria of efficacy and efficiency and providing new solutions to current demands. To this end, RIS3CAT promotes a cross-cutting vision that seeks synergies and complementarities between actions in the public and private sectors with the objective of optimising the economic and social added value generated by public resources.

RIS3CAT was drawn up in accordance with the following six principles:

1. Implementation of the European Commission methodology (RIS3 guide).
2. Strategy design based on evidence and prior agreements.
3. Government leadership and interdepartmental coordination.
4. The participation of R&I stakeholders and companies.
5. Coordination with State and EU policies.
6. Cooperation with other regions.

The Catalan economy is highly diversified and open with a large industrial base.

Within a context of globalisation and recession, the Catalan production system is undergoing a process of structural change: on the one hand, the business fabric is being destroyed, and the resulting job losses are causing high social and economic costs; on the other, many Catalan companies have successfully implemented strategies to strengthen their position on the global market through innovation. Within this context, the research and innovation system and cooperation amongst the different stakeholders (research centres, technology centres, knowledge-intensive industrial and service companies —engineering, design, etc.— administrations and users) are key to reorienting the production system towards activities with higher added value and to creating new spaces for activity with high potential for generating jobs through new combinations of existing know-how, technologies and activities.

Analysis of the Catalan economy has led to the identification of three key vectors that will enable Catalonia to successfully tackle the great social and economic challenges of the 21st century.

1. The first vector is the **legacy of the great Catalan industrial tradition** —driven in the 19th century by the textile, chemicals and iron and steel industries, and the railways, and in the 20th century by the electrical industries (energy generation and machinery production) and the automobile, pharmaceutical and agri-food sectors— which, as they have developed, have placed the emphasis on competitive factors such as innovation, technology, design and training.
2. The second vector focuses on **people's wellbeing** and concerns food, health, leisure and lifestyle. Here, R&I generates, not only economic opportunities, but also direct benefits for individuals and society as a whole.
3. The third vector is the firm commitment to transforming the Catalan economy towards a **green economy**. In response to the global challenges caused by climate change, the impact of human activity and scarcity of natural resources, the green economy offers promising niches for specialisation and generates opportunities to improve and enhance efficiency in all economic sectors.

The shared vision for the country towards 2020 takes into account all these elements.

Vision 2020

Catalonia is a country with an industrial base and an open, competitive and sustainable economy that combines talent, creativity, a diversified business fabric and its own excellent research system within the framework of a dynamic, enterprising and inclusive society. The country is home to both multinational enterprises and local companies, both consolidated industries that have become international leaders and emerging technological sectors.

Strategic Objectives

In order to advance towards Vision 2020, RIS3CAT establishes four strategic objectives:

1. To enhance the **competitiveness** of the business fabric by improving the efficiency of production processes, promoting internationalisation and reorienting established sectors towards activities with greater added value.
2. To promote **new emerging economic activities** through research, creativity and innovation in order to create and exploit new market niches.
3. To consolidate Catalonia as a European **knowledge hub** and to connect the country's technological and creative capabilities with existing and emerging sectors in the territory.
4. To make global improvements to the Catalan system of innovation, improving the competitiveness of companies, particularly SMEs, and orienting public policies towards the **promotion of innovation, internationalisation and entrepreneurship**.

Each of these objectives corresponds to a pillar of action.

Pillars of Action

RIS3CAT is structured into four pillars of action, which generate four strategic objectives and enable precise focus to be combined with a broader, cross-cutting approach:

- Pillar 1. Leading sectors.
- Pillar 2. Emerging activities.
- Pillar 3. Cross-cutting technologies.
- Pillar 4. Innovation environment.

RIS3CAT General Scheme

Pillar 1	Pillar 2	Pillar 3	Pillar 4
Leading sectors <ul style="list-style-type: none"> ▪ Food and drink ▪ Chemicals, energy and resources ▪ Industrial systems ▪ Design-based industries ▪ Industries related to sustainable mobility ▪ Health industries ▪ Cultural and experience-based industries 	Emerging activities These will be identified in the smart specialisation process	Cross-cutting enabling technologies <ul style="list-style-type: none"> ▪ ICTs ▪ Nanotechnology ▪ Advanced materials ▪ Photonics ▪ Biotechnology ▪ Advanced manufacturing 	Environment for innovation <div style="background-color: #444; color: white; padding: 2px; margin-top: 5px;">Public policies</div> <ul style="list-style-type: none"> ▪ Digital agenda ▪ Entrepreneurism ▪ Eco-innovation (green economy) ▪ Non-technological innovation ▪ Training and talent
RIS3CAT Action Plan measures <ul style="list-style-type: none"> ▪ RIS3CAT communities ▪ Specialisation and Territorial Competitiveness Projects (PECT) ▪ Emerging activities ▪ R&D cooperation projects ▪ Public-private partnerships in R&D&I ▪ Knowledge industry ▪ Technology transfer ▪ Innovative public procurement ▪ Strengthening the technological capabilities of research and innovation infrastructure ▪ International cooperation ▪ Industrial PhDs ▪ Development of RIS3CAT in Barcelona 			

Figure 10: RIS3CAT General Scheme

Source: Research and Innovation Strategy for the Smart Specialisation of Catalonia

Leading Sectors (Pillar 1)

Catalan industry is highly diversified (there is no clearly predominant sector) and, as in all other developed countries, is more than ever before closely interrelated with production services. Moreover, Catalonia enjoys competitive advantages in certain industries (such as tourism, health and culture) that represent significant added value for the smart specialisation strategy.

The three vectors that drive the transformation of the Catalan economy (industrial tradition, quality of life and the green economy) and the implementation of the seven criteria listed below enables the identification of seven leading sectors in which Catalonia has competitive advantages, critical mass and future opportunities.

1. **Critical mass** in different sectors, measured in terms of number of companies, employment and gross added value, taking into account that the available statistical classifications do not always reflect the changing reality of business strategies.
2. **Internationalisation**, measured by export indicators such as proportion of total Catalan exports or turnover, as well as analyses of the presence of foreign multinationals and potential for internationalisation.
3. Capacity of the sector to act as a **driver for other activities**. Existence of unique or particularly outstanding competitive advantages in a given sector (fairs, internationally prestigious activities, companies recognised internationally for their successful strategies, etc.).
4. Potential to generate **new economic activity** and employment, based on such factors as intensive use of labour and current growth of leading companies.
5. Global sector trends (estimates of world demand, supply, prices, Community policies, etc.) to analyse **future potential**.
6. **Tradition** of cooperation amongst quadruple helix innovation stakeholders, evaluated according to several indicators: technology transfer, formalised clusters, expenditure on innovation, etc.

RIS3CAT identifies **7** leading sectors in which Catalonia has competitive advantages, critical mass and future opportunities.



Figure 11: RIS3CAT Leading Sectors

Source: Research and Innovation Strategy for the Smart Specialisation of Catalonia

Emerging Activities (Pillar 2)

One of the challenges that RIS3CAT seeks to address is that of identifying and promoting new economic opportunities in emerging sectors based on technological capabilities (new activities generated by technological change and the latest innovations) and synergies between related sectors (between a firmly established branch and a new branch still at the development stage).

RIS3CAT includes formulae to provide tools to explore new economic activities based on a market opportunity, a technological need or new knowledge generated through cooperation by stakeholders in different sectors.

The process of drawing up RIS3CAT revealed several areas of emerging activity, such as mobile applications, printed electronics, robotics and biomass.

Cross-Cutting Enabling Technologies (Pillar 3)

Cross-cutting enabling technologies are essential for the development and manufacture of future products.

They make intensive use of knowledge and R&I and are applicable to and have the capacity to transform products and processes in a wide range of sectors of activity.

According to the four strategic objectives of RIS3CAT, one of the main challenges is to improve the connection between technological capabilities and production sectors. The technical know-how and capabilities of technology and research centres play a leading role in the emergence of new economic activities, improving the efficiency of production processes and reorienting the production system towards segments of greater added value and potential to generate employment. RIS3CAT focuses on the six cross-cutting enabling technologies.

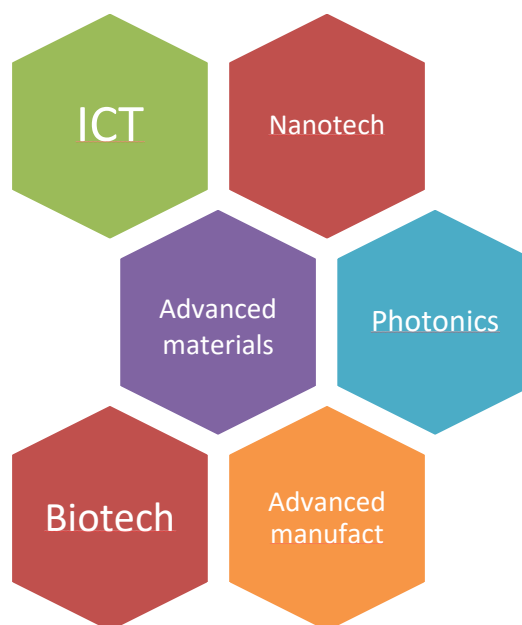


Figure 12: Cross-cutting enabling technologies
Source: Research and Innovation Strategy for the Smart Specialisation of Catalonia

Innovation Environment (Pillar 4)

The competitiveness of companies (particularly SMEs, which often lack the capacity to develop their own R&D) in the global market depends on their capacity to absorb, combine and apply know-how to commercial purposes.

Elements such as quality of training and education amongst the population, the provision of infrastructure, organisational and company management capacity and the existence of an institutional framework to support innovation and its dissemination in the economic system are, therefore, key to the competitiveness of companies in a given territory. RIS3CAT identifies and strengthens those public policies that most directly affect the quality of the innovation environment.

3.2 Focus on chemistry / bioeconomy, etc. – highlight thematic priorities

The Government of Catalonia has set out its priorities in Europe 2020 and Research and Innovation Smart Specialization Strategy (RIS3) through the ECAT 2020 and RIS3CAT strategies. As a result of the analysis of the different production sectors, and on the basis of the three key

future vectors of the economy of Catalonia (industrial tradition, quality of life and the green economy), the RIS3CAT strategy has identified seven sectors designed to lead the transformation of the economy of Catalonia towards the 2020 targets. An action plan for each one has been drawn up aimed at boosting their revitalization. One of these plans is the Programme for the Chemical, Energy and Resources Industries (PIQER).

PIQER is intended to offer a strategic agenda to strengthen the competitive position of these sectors. The main stakeholders in the ecosystem (enterprises, clusters, technology centres, etc.) and other ministries of the Government of Catalonia operating in these sectors have been involved in its design.

PIQER driving strategies are: to boost the internationalization of Catalan chemical enterprises and attract inward investment in Catalonia; to promote the integration of more competitive resource management solutions in those sectors in which they are most intensively used; to make Catalonia a global benchmark region; to encourage cooperation between chemical industry and the RDI system and to attract talent; to encourage the chemical industry to embrace the concept of 'green and circular economies'; to promote a positive image of chemicals, energy and resources industries in order to create added value.

4. Description of ERDF Operational Programme

4.1 General Structure¹

The Programme aims to boost economic growth in the region of Catalonia and to help it contribute to Europe reaching its goals of smart, green growth for all. EU funding is targeted, according to the agreed regional smart specialisation strategy - primarily on Research, Development and innovation (R+D+i) and improved access to and quality of information and communication technologies (ICT) - as well as an increase of their use in the public and the private sector (e-government, e-commerce).

The Programme will strengthen research and innovation infrastructure and networks – including linkages with private companies, and enhanced knowledge transfer between enterprises and research institutions.

SME competitiveness will be improved through enhanced access to credit, as well as advisory and other specialized services provided.

Finally, the programme will result in more renewable energy production (in particular biomass), better energy efficiency (in the private and public sector) and green public transport in cities.

Funding priorities

The Programme will focus on three main priorities (% of funding):

- Knowledge and innovation (40.9%)
- Enhancing SME's competitiveness (37.9 %)
- Green economy (21.2%)

Expected impacts

- Supporting 700 enterprises engaging in R+D activities;
- Cooperation with more than 500 research centers;
- Leverage of private investment worth over €100 million in R+D to match public funding;
- More than 680 SMEs to receive financial support;
- 15.000 SMEs will benefit from targeted support activities aimed to improve competitiveness through, for example: internationalization, eco-innovation, use of ICT etc.; and
- Purchase of over 400 energy efficient public transport vehicles.

Financial information

Total OP budget: 1,616,867,002.00 €

Total EU contribution: 808,433,501.00 €

¹ Source: http://ec.europa.eu/regional_policy/EN/atlas/programmes/2014-2020/spain/2014es16rfop011

4.2 Responsible Bodies²

Authority/Body	Authority Name/ Body or Department or Unit	Authority/Body Chief (post or function)
Managing Authority	Subdirectorato-General for ERDF Administration of the Directorate-General for Community Funds. Ministry of the Finance and Public Administrations	Subdirectorato-General for ERDF Administration
Certification Authority, if applicable	Subdirectorato-General for Certification and Payments of the Directorate-General for Community Funds. Ministry of the Finance and Public Administrations	Subdirectorato-General for Certification and Payments
Audit Authority	Intervención General de la Administración del Estado (AGE). Ministry of the Finance and Public Administrations	Interventor General de la Administración del Estado
Body to which the Commission must make payments	Subdirectorato-General del Tesoro de la Secretaría General del Tesoro y Política Financiera del Ministerio de Economía y Competitividad	Subdirectorato-General del Tesoro

Table 4: Overview of responsible bodies

Source: Catalonia ERDF Operational Programme 2014-2020

Partners

According to the provisions of Art.5 of Regulation (EU) No 1303/2013 and in Art.4 of the Code of Conduct, during the preparation and implementation phases of the Operational Programme, Catalonia has organized a partnership within the participation of the following partners:

- a) Local Authorities and other public authorities
 - a. Federation of Municipalities of Catalonia
 - b. Catalan Association of Municipalities and Regions
 - c. Diputació de Barcelona (Barcelona Provincial Council)
 - d. Diputació de Girona (Girona Provincial Council)

² Source: Catalonia ERDF Operational Programme 2014-2020

- e. Diputació de Tarragona (Tarragona Provincial Council)
- f. Diputació de Lleida (Lleida Provincial Council)
- g. Barcelona City Council
- h. Consell Interuniversitari de Catalunya (Interuniversity Council of Catalonia)
- i. Institució Centres de Recerca de Catalunya (CERCA)

b) Social and Economic Partners

- a. UGT Catalunya (labor union)
- b. CCOO de Catalunya (labor union)
- c. Foment del Treball Nacional (business association)
- d. PIMEC (business association)
- e. Consell General de Cambres de Catalunya (Council of Chambers of Commerce)

c) Organizations representing Civil Society, including non-Governmental organizations in charge of promoting social inclusion , Gender Equality and Non-discrimination :

1. Institut Català de les Dones

4.3 Priority Axes and Available Funding

The priority Axes Catalonia ERDF Operational Programme 2014-2020:

- *Priority Axis 1: Promoting Research and Innovation*
- *Priority Axis 2: Enhancing Access To, and Use and Quality of, ICT*
- *Priority Axis 3: Enhancing The Competitiveness of SMEs, the agricultural sector (for EAFRD) and the fisheries and aquaculture sector (for the EMFF)*
- *Priority Axis 4: Supporting the Shift towards a Low Carbon Economy in All Sectors*
- *Priority Axis 6: Preserving and protecting the environment and promoting resource efficiency*
- *Axis 13: Technical Assistance*

According to the thematic concentration fixed in the Article 4 of the Regulation (EU) No 1301/2013 for the most developed regions, the Catalonia ERDF Operational Programme 2014-2020 concentrates the 83.5% of the EU contribution (82.6% if we take into account the allocation to the Technical Assistance Axis) in the following thematic objectives: 1 (RDI), 2 (ICTs), 3 (SMEs) and 4 (Low Carbon Economy). If you also consider ERDF resources that the Government of Catalonia assigns to the Operational Programme SME Initiative, the thematic concentration in these objectives reaches the 84.6%. With regard to the no concentration thematic objectives, the OP earmarks 16.5% to the TO 6 (Environment).

The selection of investment priorities it is done according to: the Diagnosis conducted during the elaboration of the Research and Innovation Strategy for the Smart Specialisation of Catalonia (RIS3CAT) (FODA analysis); the Digital Agenda (diagnosis of the ICT in Catalonia); Catalonia 2020 Strategy (ECAT 2020) (diagnosis of the main document and the 2012-2014 period); and, taking into account the recommendations of the Ex Ante Evaluation to the ERDF OP.

Taking into account the above elements, the Catalonia ERDF Operational Programme 2014-2020 proposes the following **distribution of ERDF funds**:

40.4% goes to the TO1. The concentration in this TO is based on the strong commitment that makes Catalonia, in line the Europe 2020 strategy and the flagship initiative Union for innovation, research and innovation as motors for growth and employment. The TO1 focus the implementation of the RIS3CAT strategy, but this can also be considered as a transversal to the entire programme element since many applications elsewhere in OTs have a clear component of innovation.

18.8% goes to the TO3 (SMEs), reflecting the importance of the support to the business dynamism of SMEs, generated major agents of employment in the region. PO grants a role to financial instruments, which have help save one of the SMEs basic weaknesses such as access to funding.

16.3% goes to the TO6 (Environment), in order to enable a number of very different performances in the field of biodiversity, natural and cultural heritage, and urban development of great territorial impact.

15.9% goes to the TO4 (Low Carbon Economy), which is a reflection of the commitment to advance towards the goals 20/20/20 (reduce by 20 % the emissions of greenhouse gases, saving 20 % of energy consumption through energy efficiency and more increase to 20 % the use of renewable energy) , while generating major economic and employment opportunities in the business sector.

7.4% goes to the TO2 (ITCs), allowing the application of the Digital Agenda of Catalonia, also provided in the RIS3CAT strategy, given its importance as an instrument for the competitiveness and entrepreneurial dynamism.

The Table below shows the financial breakdown for Priority axes, target area, priority investment and specific objective, together with associated indicators.

Priority Axes	Fund	EU Contribution (EUR) Fund	(%) of the total EU Contribution to the Operational Programme	Thematic Objective	Investment Priorities	Specific Objectives related to the Investment Priorities	Result Indicators Related to the Specific Objectives
1	ERDF	326.704.683	40,41%	1	1.1	1.1.2	R001T
					1.2	1.2.1 1.2.2	R001D R001E
2	ERDF	60.182.442	7,44%	2	2.1	2.1.1	R010
					2.2	2.2.1	R020C,

							R020D,R020E
					2.3	2.3.1	R025
3	ERDF	151.928.169	18,79%	3	3.1	3.1.2	R030
					3.3	3.3.1	R070E
					3.4	3.4.1	R031A
4	ERDF	128.962.375	15,95%	4	4.1	4.1.2	R043a
					4.2	4.2.1	R044a
					4.3	4.3.1	R048a
					4.4	4.4.2	R049E
					4.5	4.5.1	R044J
6	ERDF	131.971.497	16,32%	6	6.3	6.3.1	R063D
						6.3.2	R065I
					6.4	6.4.1	R065E
13	ERDF	8.684.335	1,07%	99	99.99	99.99.1	N.P
						99.99.2	N.P
TOTAL	ERDF	808.433.501	100%				

Table 5: Financial breakdown for each priority axes
Source:

The table below shows result indicators details related to the specific objectives

Result Indicators Related to the Specific Objectives of CATALONIA ERDF PROGRAMME
2014-2020

Identificatio n	Indicator	Unit of measureme nt	Referenc e value	Referenc e year	Expected value (2023)	Source	Frequenc y of reports
OE.1.1.2	(R001T) Number of participations in projects funded by 7FP or Horizon 2020, led by regional	Number of participations	308	2012	435	Own preparation	Annual

	public authorities in R & D that have received ERDF funds for infrastructure construction and / or purchase of equipment						
OE.1.2.1.	R001D Percentage of Companies that perform technological Innovations	Percentage	14,4	2012	20	INE	Annual
OE.1.2.2.	R001E Companies with technological innovations that cooperate with public or private universities and research centres	Percentage	18	2012	28	Own preparation	Annual
OE.2.1.1.	R010 Percentage of population with broadband network coverage rate greater than or equal to 30 Mbps	Percentage	45,2	2013	100	SETSI	Annual
OE.2.2.1.	R020C SMEs conducting online sales	Percentage	2,2	2012	3,5	IDESCAT	Annual
OE.2.2.1.	R020D Companies using ERP software	Percentage	23,7	2009	28	IDESCAT	Annual

	business solutions						
OE.2.2.1.	R020E Companies using CRM software business solutions	Percentage	27,1	2009	33	IDESCAT	Annual
OE.2.3.1	R025 Use of the websites of administrations or public services	Persons	4.198.439	2013	6.547.500	INE/IDESCAT	Annual
OE.3.1.2.	R030 Number of SMEs (national, regional or category region)	Number	588.908	2013	640.000	INE	Annual
OE.3.3.1.	R070E Goods transported by rail	Tons	8.681.000	2013	19.628.000	Own preparation	Annual
OE.3.4.1.	R031A Regular number of SMEs exporting regularly at nationwide	Number	14.680	2013	15.900	ICEX	Annual
OE.4.1.2.	R043a Production capacity and distribution of renewable energy for thermal uses co-funded actions in the OP	Ktep/year	263,1	2013	304,25	Own preparation	Annual
OE.4.2.1.	R044a Final energy in the industry	Ktep/year	4.702,35	2014	2.963,66	Own preparation	Annual

	sector and the tertiary on 2014 consumption of co-funded actions in the OP						
OE.4.3.1.	R048a Final energy consumption in public infrastructure and services produced by the co-funded actions in the OP	Ktep/year	4.312,6	2013	4.307,76	Own preparation	Annual
OE.4.4.2.	R049E Electrical capacity in the territory	Ktep/year	24.062	2014	138.258	Own preparation	Annual
OE.4.5.1.	R044J Emission of greenhouse gases in Catalonia	KtCO2eq	42.832,77	2012	41.482,10	Own preparation	Annual
OE.6.3.1.	R063D Number of municipalities with performances in old urban areas	Number	12	2013	192	Own preparation	Annual
OE.6.3.2.	R065I Number of visits to places belonging to the natural and cultural heritage	Number	3.666.900	2013	4.700.000	Own preparation	Annual
OE.6.4.1.	R065E Area of natural heritage and	Hectares	983.039,58	2014	786.431,67	Own preparation	Annual

	in particular, those protected, benefited from improvements in their protection, promotion, development and maintenance						
OE.6.5.1.	R066C Population benefiting from measures to improve the urban environment	Persons	445.164	2014	989.138	Own preparation	Annual

Table 6: Result indicators related to specific objectives

Source: Catalonia ERDF Operational Programme 2014-2020 (page 37)

5. Description of Funding programmes

RIS3CAT tools are guided by the following principles:

- R&I as a driver for economic growth.
- Quadruple helix public-private cooperation.
- Critical mass. - International competitive advantage.
- Sectoral or technological commitment.

5.1 RIS3CAT Communities

RIS3CAT Communities are groups of companies, agents of the R & D organizations and cluster organizations in support of the company, which plans to promote activities in the field of research, development and innovation for the economic transformation of the productive activity within the areas defined in RIS3CAT



Figure 13: Logo Comunitats RIS3CAT
Source: [Accio](#)

RIS3CAT communities are voluntary associations of companies and stakeholders in the Catalan R&I system that work in coincident sectors and cooperate to incorporate R&I into production activities in the leading sectors.

RIS3CAT communities are groups of companies and stakeholders in the research and innovation system that promote R&D&I plans for the economic transformation of production activities. They receive accreditation from the Government of Catalonia through a competitive process that allows them to obtain grants from the ERDF OP to cofinance their action plans.

These communities are an essential and innovative element of RIS3CAT. As active stakeholders in the Catalan innovation ecosystem, they ensure the participation of companies and stakeholders from the system in defining, monitoring and evaluating the priorities for R&I programmes. Their multidisciplinary profile and bottom-up focus make them leading players in entrepreneurial discovery processes that lead to increasing specialisation, as they identify and generate projects related to specific topics in the leading sectors. Within the sectors they represent, the members of the communities must generate critical mass and be representative and multidisciplinary, as well as featuring considerable private sector involvement.

Instrument: Competitive calls for proposals for grants to finance RIS3CAT communities' action plans

Estimated value of projects: 200 million euros

ERDF OP: 72 million euros

Managing body: ACCIÓ

Beneficiaries: Public and private stakeholders in the research and innovation system and companies with operational bases in Catalonia

Calendar: 3 calls for proposals over the 2015-2017 period to accredit 15 communities over the course of the ERDF OP programming period

Expected results:

- Establishment of 15 RIS3CAT communities - Increased public and private investment in R&D&I and of its impact on the production system
- Improved competitiveness of RIS3CAT leading sectors.
- Increase in the participation of Catalan R&D&I companies and organisations in EU competitive programmes and European networks, in both quantitative (resources attracted and participating bodies) and qualitative terms (strategic projects)

Objectives:

- To group together R&D&I companies and stakeholders that operate in similar sectors in Catalonia in order to implement the Research and Innovation Strategy for the Smart Specialisation of Catalonia (RIS3CAT).
- To generate agendas for economic transformation based on the adoption of R&D&I and the application of cross-cutting enabling technologies (in production activities within the framework of the RIS3CAT leading sectors).
- To promote medium- and long-term work plans aimed at developing joint R&D&I projects generated by the identification of shared opportunities and needs that are key to the economic transformation of the production system in RIS3CAT areas.
- To generate new economic opportunities and create employment.

Description:

These communities, which are formed by at least eight members, including both companies and stakeholders in the research and innovation system, submit R&D&I action plans affecting a leading sector:

1. Major industrial research and experimental development projects
 - R&D projects focused on industry that include activities involving applied research, experimental development or the development of industrial demonstrators that are particularly relevant to the sector.
 - Technology valorization projects that monetise the store of knowledge accumulated by innovation system stakeholders as it is transferred to the industrial production system.
 - Actions to evaluate and validate experimental prototypes and production systems, pilot schemes, new products or services, or advanced methods and materials.
2. Technical and scientific facilities
 - Facilities such as laboratories and pilot plants to provide industry with tools for industrial validation.
 - Development of equipment and instruments of major scientific facilities. These may promote or complement other facilities that already exist in different European regions with the aim of establishing strategic synergies.

3. Interregional cooperation projects in the field of innovation
 - Actions or projects with organisations and companies in other European regions and EU countries, such as ad hoc bilateral R&D programmes, public-private partnerships (PPP), activities organised by knowledge and innovation communities (KICs), joint technology initiatives, etc.
4. Innovation projects in the fields of processes and organisation
 - Actions developed by SMEs with the goal of improving production or supply methods or significantly improving business practices, organisation in the workplace and foreign relations.

Requirements

- Be formed by at least 8 members.
- At least 4 members must be for-profit companies that have participated in a minimum of 30% of eligible expenditure accepted the plan of action presented.
- 1 member of the community RIS3CAT should act as a coordinating body.
- Members of the community should have RIS3CAT corporate purpose / foundational development activities related to a sectoral strategy RIS3CAT
- The community must submit a budget with a minimum eligible expenditure of EUR 7 million.
- The maximum grant will be 50% of eligible expenditure, with a maximum grant for each RIS3CAT community is 6 million euros.

Legal reference

http://accio.gencat.cat/cat/binaris/DOGC-Comunitats-RIS3CAT_tcm176-215557.pdf

5.2 R&D Cooperation Projects



Figure 14: Logo R&D Cooperation Projects
Source: [Accio](#)

Companies face challenges linked to the need to continuously generate new products and differential processes in order to compete globally. Catalonia is home to a powerful basic research system capable of regularly generating new knowledge in a variety of thematic fields. However, there exists a problem of connection that makes it more difficult for knowledge gathered at universities and research centres to be transferred to the business fabric.

The RIS3CAT strategy provides incentives to encourage business demand to adopt differential technology, that is to say, that projects driven by the production sector should take global and sector strategic challenges into account and benefit from the resources generated by basic research.

The objective of collaborative R&D projects is to ensure that frontier research carried out by research bodies is made available to the Catalan business fabric and benefits from the experience and know-how generated by the network of clients of technology centres and the network of innovation centres. The transfer of scientific knowledge to the industrial sector is promoted by

effective public-private cooperation between companies (local or international consortia) and scientific stakeholders. This generates new products and services with high added value that represent a substantial technological challenge and are unlikely to be completed exclusively in the private sector due to the high technology risk associated. Business consortia and consortia in which technology stakeholders participate ensure that the challenges posed by a given critical mass can be met, because they share risks and can undertake larger projects than a company would be willing to embark on alone, as well as fostering the transfer of results from research work to the business fabric. Within the context of the global economy and the knowledge society, it also becomes essential to strengthen the international dimension of business innovation. Catalonia should promote the attraction and consolidation of technology research and transfer structures and the R&D centres of multinational companies in its territory.

Instrument: Competitive calls for proposals

Estimated value of projects: 60 million euros

ERDF OP: 30 million euros

Managing body: ACCIÓ

Beneficiaries: Companies with operational bases in Catalonia

Calendar: Annual calls for proposals over the 2015-2020 period

Expected results:

- Increased private investment in R&D
- Improved technological capacity of companies in Catalonia, especially as regards cross-cutting enabling technologies
- Improved position on the international market of companies in leading sectors
- Alignment of strategic actions by R&D&I stakeholders and companies
- Research and development projects with high technological challenges and great capacity to generate externalities in Catalonia, and which are unlikely to be developed exclusively in the private sector due to their high technological risk.

Objectives:

- To promote individual or cooperative R&D projects developed in Catalonia.
- To foster technological cooperation between companies and stakeholders in the research and innovation system, both in Catalonia and in the European and international sphere (within the framework of European programmes like Eranet and bilateral programmes with other countries).

Description

Projects that include differential R&D components and have substantial impact on the territory and Catalan companies. Actions should produce results with a high degree of international impact and

intensive use of technology, and should be eligible for submission to international R&D calls for proposals and tenders.

In the projects, value is attached to the generation of jobs and industrial investment, as well as maintenance of science and production activities in Catalonia and the participation of scientific and technological stakeholders in the R&D activities involved.

The minimum overall budget is 100,000 euros for individual projects, and 150,000 euros for cooperative ones. Grants are for a maximum of 50% of the R&D investment (up to a maximum of 230,000 euros).

The projects, which have a duration of two years, focus on RIS3CAT priorities: application of crosscutting enabling technologies and impact on a leading sector.

Aid intensity:

Business Type	Research Project	Project development
Large company	50%	25%
Media company	50%	25%
Small business	50%	45%

Table 7: Overview aid intensity

Source: <http://accio.gencat.cat/cat/innovacio-tecnologica/ajuts-i-financament/nuclis-innovacio-tecnologica/>

The maximum grant per project will be:

Projects submitted individually: 100,000 Euros.

Projects submitted collaboratively: 300,000 Euros.

Legal reference

http://accio.gencat.cat/cat/binaris/DOGC_Nuclis_tcm176-216141.pdf

5.3 Innovation Vouchers

In the current economic context, the activities of research, development and innovation (R & D) are essential to achieve an improvement in productivity, sustainability and competitiveness of business and, therefore, become a target capital of the proceedings the Government of Catalonia.

It is clear that without innovation, Catalan companies cannot compete successfully in the global market. Technological innovation, enabling energy efficiency, the use of resources and materials, good performance of goods and services and creating new markets, is the main engine of productivity. Moreover, non-technological innovation, new challenges linked to organizational or process provides companies with strategic and structural changes that can generate new business opportunities and a source of competitiveness

Otherwise, the Catalan economy, like the rest of Europe, accepted the challenge of moving towards an efficient use of resources. The industry must accelerate the transition to an economy that produces low emissions of greenhouse gases and to ensure efficient use of energy and resources. This step towards a more sustainable production model represents a new opportunity for the reindustrialization of the country.

It is therefore essential that Catalan companies, especially those of smaller size and therefore with less financial capacity may have a financing tool fast, agile and flexible to meet their needs in innovation, whether technological or not through the establishment of partnerships with value-added supplier experts while also advanced in new models of green economy.

Instrument: Competitive calls for proposals

Estimated value of projects: 250.000 euros

ERDF OP:

Managing body: ACCIÓ

Beneficiaries: SME Companies with operational bases in Catalonia within 6 and 100 employees

Calendar: Annual calls for proposals over the 2015-2020 period

Description: Access fast, agile and flexible to innovation services through a direct discount on the bill from the knowledge provider.

Typology of vouchers:

- Innovation Vouchers

Design and conceptualization of new products

Improvement the management of innovation and systematizing



Figure 15: Logo Innovation Vouchers
Source: [Accio](#)

Grant up to 50% of costs, with a maximum of € 3,000.

- Technology Vouchers

Studies of technological surveillance and information on the state of the art

Feasibility studies and industrial technology, precompetitive technological developments; pilots, new methods and materials; experimental validation and testing of new prototypes, new products and services

Grant up to 50% of costs, with a maximum of € 3000, except for services precompetitive technological developments, where the grant will be 75% of the service cost with a maximum of € 5,000.

- Eco-innovation Vouchers

Eco-innovation projects; identify environmental improvements; eco design products; waste recovery and prevention; new business models related to the green economy

Grant up to 50% of costs, with a maximum of € 3,000.

Legal reference:

http://accio.gencat.cat/cat/binaris/DOGC_Cupons_2015_tcm176-215990.pdf

5.4 TECNIOspring plus

TECNIOspring Plus is ACCIÓ's fellowship programme. It provides financial support to individual mobility proposals presented by experienced researchers in liaison with a host organisation. Fellows are offered 2-year employment contracts in order to develop applied research projects.

The new programme will involve industry as much as possible (companies as host organisations, cross-sectoral secondments) since companies involved in research and technology transfer processes will be eligible host organisations. Host organisations will be entities of the industrial sector -companies based in Catalonia- as well centres recognized with the TECNIO accreditation. This fact represents an increase of the potential beneficiaries with a view to enhance the impact of the programme.

Instrument: Competitive calls for proposals

Funding: co-financed by the [H2020 Marie Skłodowska-Curie actions](#) of the European Union,

Managing body: ACCIÓ

Participants: organisations and researchers



Figure 16: Logo TECNIOspring plus
Source: [Accio](#)

TECNIOspring PLUS proposals are submitted by a Catalan host organisation, together with an experienced researcher.

- Catalan host organisations may be companies located in Catalonia with 5 or more employees, or TECNIO centres accredited by the Government of Catalonia through ACCIÓ.
- Experienced researchers are researchers of any nationality that have a PhD or four to eight years of full-time equivalent research experience. Researchers must not have resided or carried out their main activity in the country of their host organisation for more than 12 months in the 3 years immediately prior to the deadline for the submission of applications.

Calendar: Annual calls for proposals over the 2016-2021 period

Expected results: 72 fellowships for the 2016-2021 period.

Fellowships

The programme offers experienced researchers two types of fellowships:

- **Incoming:** 2-year contract in a Catalan company or a TECNIO centre
- **Outgoing + return:** 1-year contract in a research/technology centre or R&D department of a private company located outside Spain, and 1-year contract in a Catalan company or a TECNIO centre

Programme benefits

Experienced researchers will benefit from 2-year employment contracts including:

- **Salary costs** (with full social security coverage): Incoming: 58.500 € per year. Outgoing + return: 46.200 € per year x correction factor during the stay abroad.
- **Research costs:** Up to 8.640 € per year.
- **Mobility costs:** Up to 960 € per year.

With the aim of fostering the researchers' career development, the programme will include further activities:

- Top-notch tech transfer training, including entrepreneurship training
- Secondments and short visits
- Participation in public engagement activities
- Networking activities within the fellows' community

6. Governance

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

The Process of Drafting RIS3CAT

RIS3CAT was drawn up in accordance with the following six principles:

1. Implementation of the European Commission methodology (RIS3 guide).
2. Strategy design based on evidence and prior agreements.
3. Government leadership and interdepartmental coordination.
4. The participation of R&I stakeholders and companies.
5. Coordination with State and EU policies.
6. Cooperation with other regions.

The Process of Drafting RIS3CAT

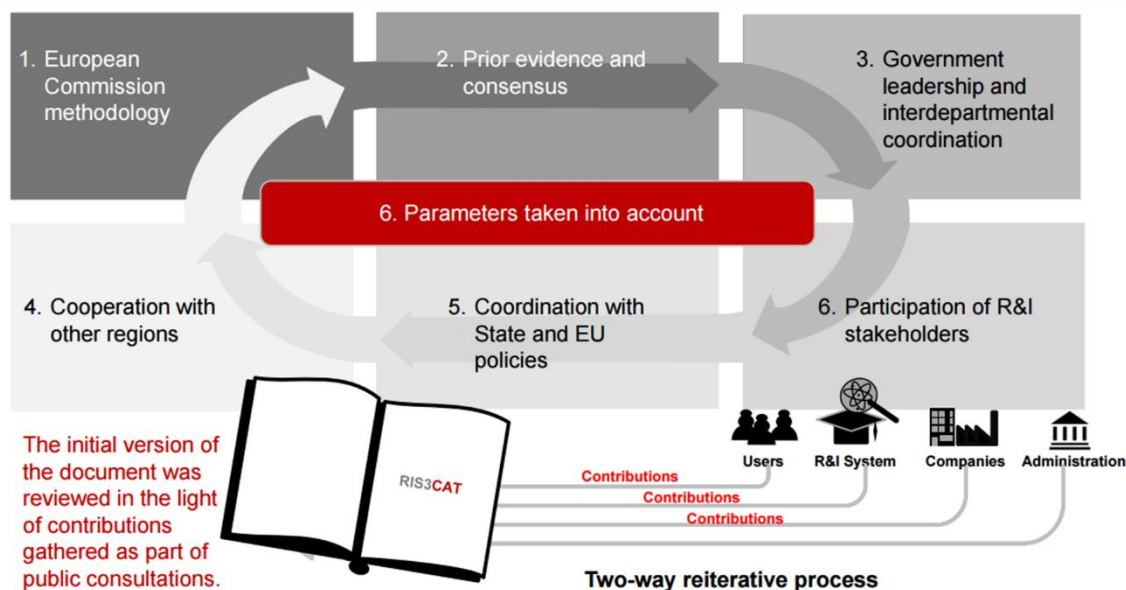


Figure 17: Process of drafting RIS3CAT

Source: Research and Innovation Strategy for the Smart Specialisation of Catalonia

The work of drafting RIS3CAT was promoted and coordinated by a Steering Committee formed by representatives from the ministries of Economy and Knowledge and Business and Labour. The document was produced in a two-way, iterative process that combined both top-down and bottom-up approaches, as established in the European Commission's RIS3 Guide.

The starting-point was an analysis of the strengths, weaknesses, opportunities and threats to the Catalan economy based on SWOT analyses carried out previously in Catalonia and on which there is broad agreement amongst stakeholders in the research and innovation system. The

participatory process that took place in 2008 and led to the drafting of the Catalan Agreement on Research and Innovation also played an important role in formulating RIS3CAT.

In July 2013, an initial draft of the RIS3CAT strategy document was submitted to stakeholders and civil society in general in an online public consultation process. This consultation attracted considerable participation (176 contributions), mainly from the fields of universities, research and business.

In the second half of 2013, this draft version was revised to incorporate the suggestions received. For further information about the process of drafting the RIS3CAT strategy and the public consultation.

The Government is responsible for designing, planning and implementing such policies, but in many cases they can only be put into effect in cooperation with other stakeholders (other public authorities, employers' organisations, companies, trade unions, workers' associations, etc.).

Drafting RIS3CAT was a bidirectional and iterative process that combines top-down and bottom – up approach.

During 2013 European Commission has facilitated expert advice and assessment, who monitored and evaluated works and conclusions.

The process of drafting the RIS3CAT was characterized by the continuous dialogue with stakeholders to define Catalonia smart specialization and strengthen the position of the Catalan economy and its system of research and innovation in the world.

Companies, universities, research centers, technology centers, and entrepreneurs are the agents who are in a better position to discover areas of excellence in R & D based on existing capabilities and productive assets, is ie, to identify areas of smart specialization. Also, local governments, in contact with territory also play an important role in the articulation of agents to develop integrated regional initiatives.

The contributions to the RIS3CAT was articulated through various ways:

- Expert Group.
- Public consultation.
- Permanent Consultative bodies in the field of research.
- Dialogue with the stakeholders in the system.
- Coordination with the local administration.

In the context of the work involved RIS3CAT has come into contact with other European regions to explore opportunities for collaboration.

Finally, for each sectoral strategic axis were created working groups for specific actions and strategies and a committee was formed to boost monitoring and evaluation initiatives.

S3Chem stakeholders' ecosystem

ACCIO will create a local innovation community with focus on chemical sector, which will form the basis for the Regional Stakeholder Group of the S3Chem project.

Once per half year they will come together to discuss explicitly the project activities related to the respective thematic priorities

1. Description of current situation,
2. Stakeholder involvement,
- 3 Project generation,
4. Funding measures,
5. Impact oriented evaluation and steering process and
6. Action plan development.

There have also been created specific working groups to discuss the challenges and needs of the chemical industry, in response to current and global challenges; analysis of innovation and funding instruments available and preparation of the dissemination event to take place in Barcelona at the end of 2017.

During the Regional Stakeholder Meetings the participants can integrate their experience into the project as input for the interregional learning process. At the same time the ACCIO will inform the regional stakeholders about the progress of work and interesting experiences from other regions.

The conclusions and recommendations from the respective thematic priorities will be discussed in a peer review workshop with the stakeholders to receive a final feedback and give room for fine tuning.

The regional stakeholders are also invited to participate in the annual dissemination conferences in order to access the knowledge that was generated in the interregional learning process. At the same time they can establish direct contacts with stakeholders from other partner regions to engage in direct cooperation for innovation and research projects also at international level. This should contribute to increased participation in EU innovation projects.

6.2 Description of established structures and stakeholders

Representatives from industry, administration and academia worked together to define the main challenges and opportunities.

This will be dynamic and updated in accordance with its results and the needs that may arise.

In this way the **public drive meets the private leadership**.

These stakeholders have been participated in the previous process to define and develop the industrial strategies in this field in Catalonia.

Companies, technological centers and research centers would be beneficiaries of the ERDF fundings.

The Industry Directorate of Catalan Government will be responsible for the industrial policy, but the country's industrialization and improve innovation depends on the effort made by companies. This strategy is therefore only meaningful if it facilitates and supports initiatives by companies.




These partners will provide both scientific and technological and business knowledge to contrast innovation measures.


This group will be involved as technical experts in the project. They will support ACCIÓ to gather information/data about the technologies, about the sectors involved and the state-of-the-art. They will also share their knowledge/best practices with the other regions, attend and even participate as experts in the panels of technical meetings/events and collaborate in those tasks that will reinforce the interregional collaboration and the position of Catalonia.

Due to the wide range of companies, in the near future Catalonia could consider the possibility to involve other stakeholders in this group in order to achieve the main challenges for the region.

They could also serve to conduct and lead pilot projects

<p>EURECAT www.eurecat.org</p> 	<p>Eurecat is the result of integrating the TECNIO network's most important technology centres in Catalonia. With 38M€ of incomes, EURECAT integrates more than 450 professionals and participates in over 100 R&D&i high-level strategic projects. Therefore, the role of this stakeholder could be extremely important to achieve several of the Industrial Systems Promotion Program challenges and, particularly, for the implementation of the RIS3CAT.</p>
<p>CTQ http://www.ctq.cat/</p> 	<p>Center for Chemical Technology.</p> <p>It aim is to effectively contribute to the sustainability, competitiveness, innovation and technological progress of European companies and organizations in the chemical and related industries, and become the center of international reference in sustainable chemistry.</p>
<p>ICIQ Institute of Chemical Research of Catalonia http://www.iciq.org/</p> 	<p>The Institute of Chemical Research of Catalonia Centre of excellence, an internationally recognised leading institution in the field of chemistry committed with performing research at the frontiers of knowledge</p>
<p>Regional Activity Centre for Sustainable Consumption and Production http://www.cprac.org/en/about-us/scp/rac</p> 	<p>The Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC) is a centre for international cooperation with Mediterranean countries on development and innovation in the production sector and civil society, based on more sustainable consumption and production models.</p> <p>The Centre develops its activity under the Mediterranean Action Plan (MAP) for the protection and development of the Mediterranean basin, an organisation belonging to the United Nations Environment Programme (UNEP).</p>

<p>Universitat Autònoma de Barcelona (UAB) http://www.uab.cat/departament/quimica/</p> 	<p>The Universitat Autònoma de Barcelona (UAB) is a public university of an international outlook, fully integrated within its area, offering quality education in close association with research activity, the transfer of scientific, technological, cultural and educational knowledge, the promotion of the potential of its human capital and the responsible management of available resources.</p> <p>The Department of Chemistry is structured according to the four areas of knowledge comprise: Analytical Chemistry, Physical Chemistry, Inorganic Chemistry and Organic Chemistry.</p>
<p>University of Barcelona. Faculty of Chemistry http://www.ub.edu/quimica/</p> 	<p>The Faculty of Chemistry Teaching for years the teachings of Chemistry, Chemical Engineering and Materials Engineering, which has extensive experience and tradition, with the best teaching quality, widely recognized. The Faculty participates in national and international research projects with a considerable exchange of knowledge, teachers and students. With these projects reaches a very high scientific production, which justifies the recognized quality of research in the Faculty.</p>
<p>IQS http://www.iqs.edu/en</p> 	<p>IQS is a Higher Education Center founded by the Society of Jesus, with over one hundred years of experience and an extensive track record and history in the academic field that enable the institution to offer a fully consolidated and proven teaching method.</p> <p>IQS aims to provide a response to the essential questions that concern the scientific community and business environment at any given time, by educating professionals with a global vision in a constantly changing world.</p>
<p>Universitat Rovira I Virgili http://www.fq.urv.cat/facultat/en_presentacio.html</p> 	<p>The URV was created in 1991 by the Parliament of Catalonia from the already existing university faculties and schools. In this way the Tarragona University of the 16th century was restored.</p> <p>The School of Chemistry's main objective is to provide good graduates in Chemistry and Biochemistry to society. Fully related to their environment, the faculty responds to a clear social need, as it is located in the middle of what will be the largest petrochemical and industrial center in southern Europe.</p>
<p>Universitat de Lleida http://www.udl.cat/ca/en/faculties/etsea/</p>	<p>The University of Lleida is a public university, dynamic, innovative and at the service of society and with universal vocation.</p>

 <p>Universitat de Lleida</p>	<p>School of Agricultural Engineering, which is the largest agri-food and forestry campus in Catalonia and one of the largest in Spain. It was created in 1972 for the Agricultural Engineering studies. Its growth and development have been constant, and currently the degrees taught and the research carried out in this faculty have been recognized for their quality in all agricultural areas: plant, forestry and animal production; food science and technology, and biotechnology.</p>
<p>ChemMed http://www.chemmedcluster.com/</p> 	<p>ChemMed an industrial, logistical, academic and scientific chemical cluster.</p> <p>With more than a hundred chemical companies of all sizes Production companies and that service companies. Production includes Petrochemicals, Polyolefins, Plastics, Organic Chemical Products and Industrial Products as well as Specialty Chemicals and Fine Chemicals, thus representing the classic value-creation chain</p>
<p>FEDEQUIM http://www.fedequim.es/eng/default.htm</p> 	<p>FedeQuim is a non-profit organisation whose objective is to defend the rights and interests of the chemical companies, especially in Catalonia.</p> <p>FedeQuim offers a permanent information and advise service to its associated, always looking after the progress of the sector companies and the betterment of its competitiveness and public image in cooperation with the Spanish Chemical Industry Federation (FEIQUE) and other associations linked to the sector.</p> <p>Today, FedeQuim has 220 direct Associate companies and 5 attached Associations, together forming a collective of more than 500 companies, a guarantee of its corporate representation.</p>
<p>AFAQUIM http://www.afaquim.org/</p> 	<p>AFAQUIM, Manufacturers' Association of Pharmaceutical Chemistry groups and represents the set of manufacturing plants of Active Principles and Intermediate Pharmacists (API), of which 30 companies belong to AFAQUIM. This sector has a turnover near 1.500 million Euros and an export of about 1.000 million Euros.</p>

<p>MAV http://www.clustermav.com/en/index.htm</p> 	<p>Cluster Advanced Materials Cluster.</p> <p>The MAV cluster includes companies and agents throughout the value chain that share a common technological base: new metallic materials, composite materials, polymeric materials and ceramic materials.</p> <p>The main objective of the cluster is to improve the conditions of the environment and the promotion of successful business strategies for both individual companies, and especially for groups of companies.</p>
<p>Beauty cluster Barcelona http://beautyclusterbarcelona.com/en/</p> 	<p>A cluster is an effective instrument for connecting businesses and agents in the same business and accordingly to common interests, to identify and implement projects, both individually and collaboratively, to help improve the competitiveness of the participating companies.</p> <p>The Beauty Cluster Barcelona is open to companies and agents in the business of The beauty market value chain: Raw materials, ingredients, auxiliary third party-manufacturing, cosmetics and perfumery own manufacturers, packaging, electro-medical equipment, R & D centres and third-party service providers.</p>
<p>INKEMIA http://www.inkemia.com/en/</p> 	<p>InKemia has as a mission the generation of knowledge of high technological value to give support to the industries in the life sciences field.</p> <p>InKemia has as objective to generate knowledge of high technological value for the chemical, pharmaceutical, biotechnological, cosmetic, nutraceutical and related industries.</p> <p>Since its establishment, IUCT has signed some 300 contracts with companies for R & D, technical services and consulting, accumulating more than one service or project for any company. Of which we could highlight 25 projects of R & D for companies. In the area of own R & D for technology transfer companies generated IUCT designed and developed 17 projects under the different policy areas. Developed over the past 3 years are detailed below. Of these projects they have requested five national patents which have been extended to PCT. It is currently being drafted 2 more patents.</p>

<p>AGBAR http://www.agbar.es/en</p> 	<p>Since 1867, the companies which make up Agbar have brought the future to the management of water and the environment, continuously applying new developments, technological advances and knowledge. After over 145 years, Agbar is an international benchmark, with a presence in eleven countries: Spain, Chile, the United Kingdom, Mexico, Colombia, Algeria, Peru, Brazil, Turkey and United States.</p> <p>Agbar adapts to the needs of the societies in which it participates in order to offer the best service to 25,6 million people, every day.</p>
<p>SUEZ ENVIROMENT http://www.suez-environnement.com/</p> 	<p>As an industrial services and solutions company specialising in securing and recovering resources, SUEZ provides its customers (local authorities, industry and consumers) with concrete solutions to address new resource management challenges.</p>
<p><i>Ministry of the Vice-presidency and of the Economy and Finance</i> <i>Government of Catalonia</i> http://economia.gencat.cat/en/inici/index.html</p>	
<p><i>Ministry of Business and Knowledge</i> <i>Government of Catalonia</i> http://empresa.gencat.cat/en/inici/</p>	
<p><i>Ministry of Territory and Sustainability</i> <i>Government of Catalonia</i> http://territori.gencat.cat/ca/inici/</p>	

Table 8: Catalan Stakeholders Proposal
Source: Own elaboration

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

Current Challenges

- Improvement of the RIS3CAT capacity of absorbing new knowledge and adaptation.
- Peer learning for improving the engagement of the chemical ecosystem stakeholders in the RIS3CAT RDI Instruments, by fostering the public-private cooperation and the technological transfer between academia and industry.
- Leverage the impact of the ERDF funds and get new know-how to achieve RIS3CAT RDI Instruments sustainability.
- Identify new projects related to chemical and bio-economy that may be funded under the ERDF grants.
- Design new strategies to increase the competitiveness of the chemical enterprises, seeking new processes and materials and creating new economic activities and new jobs.
- Increase the participation of stakeholders, improve coordination between areas
- Integration and hybridization of clusters and scopes to better respond to global challenges.
- Pilot implementation of brand RDI new instruments (implemented in other S3Chem regions) to achieve the main challenges of the Chemical Sector.

Expectations

- Contribution to RIS3Cat Implementation
- Chemical ecosystem consolidation
- To transform challenges in programmes and business reality
- New tools and instruments for booster chemical sector.
- Evolution and adaptation innovation measures.
- Transregional Project Generation
- Pilot demonstration. Circular Economy. Bioeconomy
- Ambitious, but realistic Implementation Action Plan
- Reinforce synergies

Outputs

- 2 RIS3CAT Communities in the chemical / bio economy sector.
- 5 R&D cooperation projects in the chemical / bio economy sector.