RIS3CAT

Action Plan 2015-2020

May 2018

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1. Introduction

In 2012, the Catalan Government approved the Catalonia 2020 Strategy (ECAT 2020). In line with the Europe 2020 Strategy, ECAT 2020 promotes smart, sustainable, inclusive growth through action in six priority areas: employment and training; social cohesion; innovation and knowledge; entrepreneurism; internationalisation; and green economy.

In February 2014, within the framework of this strategy, the Government approved the Research and Innovation Strategy for the Smart Specialisation of Catalonia (RIS3CAT), which establishes the priorities for public R&D&I policies and actions supported by the ERDF Operational Programme in Catalonia 2014-2020 (hereafter, ERDF OP).

The document entitled RIS3CAT, Research and Innovation Strategy for the Smart Specialisation of Catalonia (available at: *http://catalunya2020.gencat.cat*) describes a vision of Catalonia as 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.

To advance towards making Vision 2020 a reality, the measures provided under RIS3CAT focus on 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.

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inclusive growth through action in six priority areas: employment and training; social cohesion; innovation and knowledge; entrepreneurism; internationalisation; and green economy.

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The document entitled RIS3CAT, Research and Innovation Strategy for the Smart Specialisation of Catalonia (available at: *http://catalunya2020.gencat.cat*) describes a vision of Catalonia as 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.

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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 connect the country's technological and creative capabilities with both sectors that already exist in the territory and those that may emerge.

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.

RIS3 strategies are based on open innovation models in which, besides companies, research and innovation stakeholders and the public administrations, citizens should also be present as the main beneficiaries and users of innovations. This is particularly important in a context in which the new responses to the great economic, social and environmental challenges necessarily require changes in behaviour, at both individual and societal scale.

Graph 1. Schematic diagram of the quadruple-helix territorial model of innovation
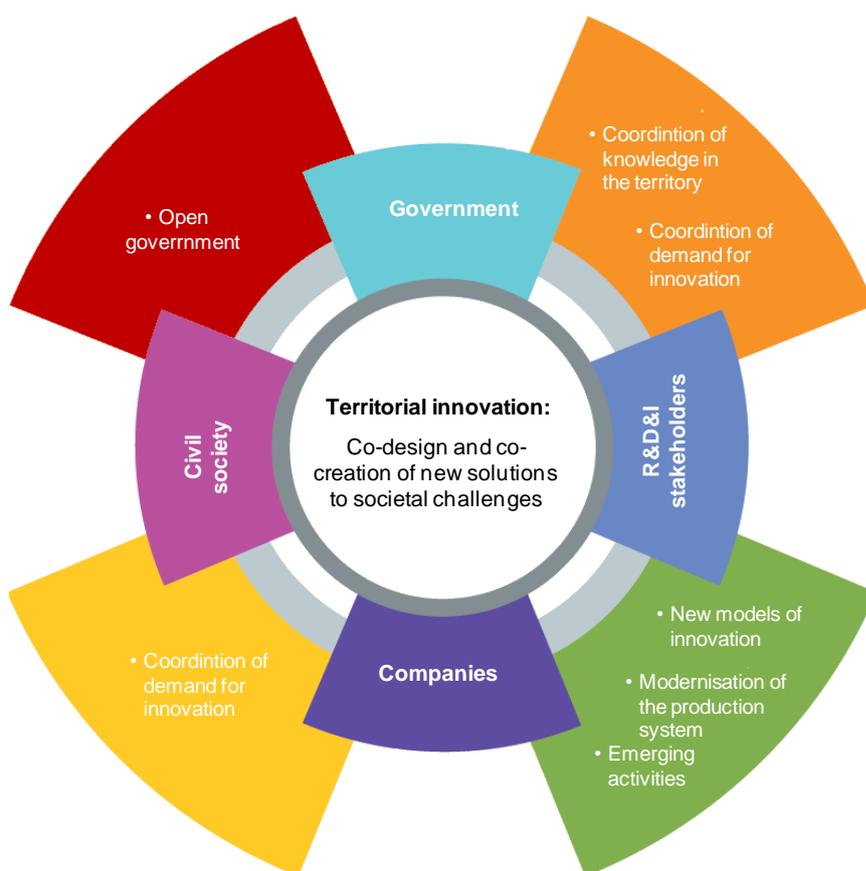
Source: DG Economic Promotion, Competition and Regulation.

Accordingly, the implementation of RIS3 strategies entails shifting from a triple-helix model of innovation (based on interaction between research and innovation stakeholders, the public administration and companies) to a quadruple-helix model, which also includes users of products and services, placing them at the centre of the innovation process.

This document describes the actions established under the RIS3CAT Action Plan and how they are financed by the ERDF Operational Programme in Catalonia 2014-2020 (hereafter, ERDF OP).

The implementation of the actions described in the RIS3CAT 2015-2020 action plan is described in annual monitoring reports, the first of which was published in October 2017 (*http://catalunya2020.gencat.cat/web/.content/00_catalunya2020/Documents /estrategies/fitxers/informe-seguiment-ris3cat.pdf*).

The RIS3CAT monitoring and evaluation system is described in the document *RIS3CAT Monitoring System* (*http://catalunya2020.gencat.cat/web/.content/00 _catalunya2020 /Documents /estrategies/fitxers/monitoratge-RIS3CAT.pdf*). This document provides an in-depth description of RIS3CAT governance, goals and indicators.

2. RIS3CAT actions

To achieve its strategic and operational objectives, the RIS3CAT strategy establishes actions that focus on four priority pillars:

- **Pillar 1.** Promoting the seven leading sectoral areas that, due to their importance and potential, can help to generate economic recovery and reorient the Catalan economy towards a growth model that is smarter, more sustainable and more inclusive: food and drink; chemicals, energy and resources; industrial systems; design-based industries; industries related to sustainable mobility; health industries, and cultural and experience-based industries.

- **Pillar 2.** Identifying and promoting new economic opportunities in emerging sectors, based on technological capabilities (new activities generated by technological change and cutting-edge innovation) and synergies between different but related sectors.

- **Pillar 3.** A commitment to cross-cutting enabling technologies as the main instrument for transforming the production system and generating new scientific, technological and economic opportunities. The six priority cross-cutting enabling technologies in the RIS3CAT strategy are: ICTs, nanotechnology, advanced materials, photonics, biotechnology and advanced manufacturing.

- **Pillar 4.** Improving the innovation environment through the public policies implemented by the Government that affect the research and innovation system. These policies concern the digital agenda, entrepreneurship, eco-innovation, non-technological innovation, and training and talent.

The document *Research and Innovation Strategy for the Smart Specialisation of Catalonia* (*http://catalunya2020.gencat.cat/web/.content/00_catalunya2020/Documents /angles/fitxers/07_ris3cat_2014_en.pdf*), approved by the Government of Catalonia in 2014, defines a broad concept of innovation that includes both social innovation and innovation in public services. Social innovation forms part of RIS3CAT Pillar 4 ("Innovation Environment"), a cross-cutting pillar that includes all the instruments used in the strategy.

While the RIS3CAT Action Plan focuses on actions established in Thematic Objective 1 of the ERDF OP, it also includes innovative actions (often aimed at providing a response to social challenges) established under thematic objectives 2, 3, 4 and 6 of the ERDF OP. This is the case, for example, of projects in the field of ICTs aimed at improving processes and services for citizens, and initiatives that contribute to advancing towards a more sustainable economic model through energy efficiency or the efficient use of resources.

The innovative actions established by RIS3CAT to be implemented under thematic objectives 2, 3, 4 and 6 of the ERDF OP must meet the following requirements:

- To provide an innovative response to a social challenge, this may be an unresolved problem, an unsatisfied need or an unexplored or unexploited opportunity.

- To contribute more effective responses to the challenge than those obtained from the methods and solutions currently applied.

- To design and implement public services with the active collaboration of users and the stakeholders involved.

- To provide for the way in which their impact will be measured and how they can be implemented in other territories or areas, so that any learning can be used to the benefit of other projects.

The changes compared to the Action Plan approved in 2017 are as follows:

- The amounts devoted in the ERDF OP to the following areas are increased: public procurement of innovation (from 55 MEUR to 75 MEUR); emerging technologies (from 16 MEUR to 18 MEUR); research infrastructure (from 70 MEUR to 98.4 MEUR); and Catlabs (2 MEUR).

- The amounts devoted in the ERDF OP to the following areas are decreased: RIS3CAT community instruments (from 72 MEUR to 54 MEUR); technology centres (from 30 MEUR to 16 MEUR); and knowledge transfer (from 40 MEUR to 31.6 MEUR). The R&D cooperation projects instrument now includes both local and international clusters.

- Two instruments, Public-Private Collaboration in R&D&I and Technology Transfer, are merged to create the Knowledge Transfer instrument, which includes actions to provide financial support for university knowledge valorisation and transfer units; to promote the creation of aggregated acceleration entities at research centres in Catalonia; to support R&D&I; and to support junior innovators.

- The Digital Innovation Hub of Catalonia instrument is created and financed by 15 MEUR from the ERDF OP.

- The International Cooperation Instrument, which had a budget of 10 MEUR from the ERDF OP, is eliminated.

- A new instrument, Innovation Projects by the Public Administration within the Framework of the Open Science and Innovation Paradigm, is established and provided with 35 MEUR from the ERDF OP, including actions by both the Government of Catalonia (17.5 MEUR) and Barcelona City Council (17.5 MEUR).

The instrument to develop RIS3CAT in Barcelona, which referred to actions by Barcelona City Council within the framework of the RIS3CAT agreement signed on 9 November 2015, is eliminated. The actions of public procurement of innovation by Barcelona City Council (5 MEUR from the ERDF OP) are included in the Public Procurement of Innovation Programme. ICT actions are included in the new instrument Innovation Projects by the Public Administration within the Framework of the Open Science and Innovation Paradigm (17.5 MEUR from the ERDF OP). Entrepreneurship actions by Barcelona City Council are excluded from the RIS3CAT 2015-2020 Action Plan.

Box 1. RIS3CAT: schematic diagram

Pillar 1	Pillar 2	Pillar 3	Pillar 4
Leading sectors	Emerging activities	Cross-cutting enabling technologies	Environment for innovation
- Food and drink - Chemicals, energy and resources - Industrial systems - Design-based industries - Industries related to sustainable mobility - Health industries - Cultural and experience-based industries	These will be identified in the smart specialisation process	- ICTs - Nanotechnology - Advanced materials - Photonics - Biotechnology - Advanced manufacturing	**Public policies** - Digital agenda - Entrepreneurism - Eco-innovation (green economy) - Non-technological innovation - Training and talent

RIS3CAT Action Plan measures

- RIS3CAT communities
- Specialisation and Territorial Competitiveness Projects (PECT)
- Emerging technologies
- R&D cooperation projects
- Public-private partnerships in R&D&I
- Industry of Knowledge
- Technology transfer
- Public procurement of innovation
- Strengthening the technological capabilities of research and innovation infrastructures
- International cooperation
- CatLabs
- Advanced digital technologies
- Development of RIS3CAT in Barcelona

Source: DG Economic Promotion, Competition and Regulation.

Box 2 describes measures carried out under the Action Plan at May 2018 and expected ERDF OP cofinancing.

Box 2. Financing of Action Plan Measures by the ERDF OP

Instrument	Estimated cost of projects	ERDF OP
RIS3CAT Communities	EUR 150 million	EUR 54 million
PECTs	EUR 144 million	EUR 72 million
Emerging technologies	EUR 36 million	EUR 18 million
R&D cooperation projects	EUR 32 million	EUR 16 million

RIS3CAT

Instrument	Estimated cost of projects	ERDF OP
Technology transfer	EUR 63,2 million	EUR 31,6 million
Knowledge industry	EUR 32 million	EUR 12 million
Public procurement of innovation	EUR 150 million	EUR 75 million
Strengthening the technological capacities of research and innovation infrastructure	EUR 196,8 million	EUR 98,4 million
Digital Innovation Hub of Catalonia	EUR 30 million	EUR 15 million
Catlabs	EUR 4 million	EUR 2 million
Collaborative projects in the field of advanced digital technologies	EUR 20 million	EUR 10 million
Innovation projects by the Public Administration within the framework of open science and innovation paradigm	EUR 70 million	EUR 35 million

There follows a description of each of the measures established in the Action Plan.

1. RIS3CAT communities

Instrument	Competitive calls for proposals for grants to finance RIS3CAT communities' action plans
Estimated value of projects	150 million euros
ERDF OP	54 million euros
Managing body	ACCIÓ
Beneficiaries	Public and private stakeholders in the research and innovation system and companies with operational bases in Catalonia
Calendar	- The first call for proposals was resolved in 2016 (19.9 MEUR from the ERDF OP for 5 RIS3CAT communities; 235 beneficiaries) - The second call for proposals was resolved in 2018 (24 MEUR from the ERDF OP for 6 RIS3CAT communities; 290 beneficiaries) - A third call for proposals is planned for 2018 (10 MEUR from the ERDF OP)
Expected results	- Establishment of 13 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)

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.

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 valorisation 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 instruments 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.

2. Specialisation and Territorial Competitiveness Projects (PECTs)

Instrument	Calls for competitive proposals for grants for PECTs action plans
Estimated value of projects	144 million euros
ERDF OP	72 million euros
Managing body	Directorate-General for Local Government, Government of Catalonia
Beneficiaries	Local organisations, stakeholders in the research and innovation system and not-for-profit organisations
Calendar	- The first call for proposals was resolved in 2018 (30.5 MEUR from the ERDF OP for 25 PECTs; 144 operations) - A second call for proposals is planned for the final quarter of 2018
Expected results	- Contribution to territorial balance by promoting PECTs throughout the territory - Increased cooperation between stakeholders in the territory (public administrations, universities and stakeholders in the research and innovation system, companies and other organisations and stakeholders in the territory) - Increase in public and private investment in R&D&I and in its impact on the production system - Job creation

Specialisation and Territorial Competitiveness Projects (PECTs) are initiatives promoted by stakeholders in the territory and led by local public bodies. PECTs are projects with a high degree of innovation, aimed at transforming the territory's economy. The basic characteristics of PECTs actions are as follows:

- They form part of a territorial strategy that enjoys wide local support.

- They pursue specific, cohesive objectives.

- They have multiple impacts on the territory, contributing to smart specialisation, improving competitiveness, creating employment and, wherever possible, establishing links with the international value chain.

Objectives

The PECT objectives are defined by the territorial nature of the action they promote:

- To improve the competitiveness of the production system.

- To create jobs.

- To establish links with the international value chain.

Description

PECTs contribute to the smart specialisation process in Catalonia, their actions focusing on the territory in which the intervention takes place.

PECTs are promoted and led by a public body in the territory, which coordinates the participating partners. The PECT governance system is regulated by an agreement amongst all the parties involved. PECTs generate critical mass and representativeness in their territory of action. Their members may include local bodies, universities, technology and research centres, companies and other players or stakeholders in the territory.

PECTs promote action plans that include, basically, initiatives focused on the following activities:

- Support for research and innovation activities launched by companies and for the establishment and consolidation of innovative companies.

- Transfer and dissemination of knowledge.

- Development of entrepreneurship ecosystems.

- Development of ICT products and services.

- Promotion of energy efficiency and the use of renewable energy (both by SMEs and public infrastructure).

Promotion and dissemination of sector and inter-sector innovation structures in the territory, or protection, promotion and development of cultural and natural heritage and improvement of the training and knowledge environment.

3. Emerging Technologies

Instrument	Competitive calls for proposals for groups of R&D&I stakeholders to promote pilot demonstration platforms in key technology areas for Europe and Catalonia
Estimated value of projects	36 million euros
ERDF OP	18 million euros
Managing body	Directorate-General for Research, Government of Catalonia
Beneficiaries	Stakeholders in the public research and innovation system operating in Catalonia
Calendar	A call for proposals (18 MEUR from the ERDF OP) will be announced in 2018
Expected results	- Increased relative weight of activities with high technology content and high added value in the production system - Generation of new economic activity in emerging fields with high growth potential - Creation of new companies in emerging fields - Renewal of the production system by knowledge-intensive, high added-value activities - Generation of highly-qualified jobs and retention of talent in the territory

Through the Horizon 2020 programme and other initiatives, the European Commission promotes the transformation of economic, social and production sectors that are key for maintaining the global competitiveness of the European economy in the long term: scientific research, technological advances and knowledge. The RIS3CAT strategy for dynamic development provides for the introduction of emerging technologies and activities into the production system in a process of anticipation and adaptation to technological changes and new competitive scenarios.

Objectives

- To foster, through new technologies and technological applications, the development and growth of emerging activities in the industrial system and promote economic growth and the creation of highly skilled jobs.

- To promote the creation and consolidation of new areas of knowledge that can form the basis of emerging industrial activities.

- To generate new economic activities or transform existing activities and increase the long-term competitiveness of the production system.

Description

The programme devoted to the emerging technologies promotes the development of new activities based on innovative, disruptive technologies and processes aimed at opening up new markets or transforming existing ones.

The programme focuses on emerging technologies and technological applications that must have the following characteristics:

1. The European Union is fully committed to them as a future strategy, and they are a priority in the Horizon 2020 programme.

2. They have great potential for generating new economic activities.

3. They are a priority in the Government of Catalonia's research and innovation policies.

The programme focuses on the following emerging technologies: the human brain, big data in life sciences, fusion power, graphene, 4.0 industry, the Internet of Things, additive manufacturing (3D printing), low-consumption processor technology, and quantum technology.

The Catalan Government's support for emerging technologies is coordinated through public calls for proposals aimed at R&D&I stakeholders that are engaged in major European initiatives within their respective fields of action. This support is designed to promote new emerging activities based on disruptive innovative technologies or processes aimed at opening up new markets or transforming existing ones.

The central plank of these projects must be the creation or extension of demonstration platforms for new technologies that focus on the production system. With regard to these platforms, the following activities are also eligible for financing:

- Valorisation of new knowledge and technologies for transfer to market.

- Projects for public-private partnerships to speed up the market introduction of new products or processes.

- Mobility of scientific and technological personnel between universities, scientific institutions, research centres, technology centres, and companies.

- Promotion and support for the creation of new technology-based companies.

- Specific training programmes.

4. R&D cooperation projects

Instrument	Competitive calls for proposals for support for companies that cooperate with R&D&I system stakeholders on technological innovation projects
Estimated value of projects	32 million euros
ERDF OP	16 million euros
Managing body	ACCIÓ
Beneficiaries	Companies with operational bases in Catalonia
Calendar	- The first call for proposals was resolved in 2015 (4.8 MEUR from the ERDF OP for 58 beneficiaries) - The second call for proposals was resolved in 2017 (5.2 MEUR from the ERDF OP for 55 beneficiaries) - The third call for proposals (6 MEUR from the ERDF OP), launched in 2017, will be resolved in 2018
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 - Increase in partnerships with other European regions - Increase in the participation of Catalan R&D&I companies and entities in competitive programmes promoted by the European Union, and in European networks

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. Projects with an international component are financed through the international cooperation instrument.

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.

- To build strategic synergies and complementarities with other countries and regions in RIS3CAT priority areas.

- To involve research and innovation companies and stakeholders in Catalonia in European-wide R&D initiatives and pilot projects.

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. In view of the fact that R&D processes are becoming increasingly open and global, it will be necessary to establish lines of international collaboration in many cases. Accordingly, both local and international R&D projects are planned.

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 projects, which have a duration of two and a half years, focus on RIS3CAT priorities: application of cross-cutting enabling technologies and impact on a leading sector.

The minimum overall budget is 200,000 euros for individual projects, and 500,000 euros for cooperative ones. The maximum amounts of these grants are 125,000 euros in the case of individual projects and 300,000 euros for cooperative initiatives; moreover, grants are for a maximum of 50% of the R&D investment.

The objective of international hubs is to open up the R&D capacities of Catalan companies through collaboration with R&D&I companies and stakeholders in countries and regions with which ACCIÓ has established bilateral technological cooperation agreements (Israel, Germany, Chile and France), and with certain countries and regions with high technological levels (EU-28, Canada, Massachusetts, the United Kingdom, South Korea, Cuba, China and Singapore).

5. Technology transfer

Instrument	Competitive calls for proposals
Estimated value of projects	63,2 million euros
ERDF OP	31,6 million euros
Managing body	Directorate-General for Research, Government of Catalonia, and other research bodies
Beneficiaries	Universities and research centres
Calendar	- A call for proposals for grants for university knowledge valorisation and transfer units will be resolved in the first half of 2018 - A call for proposals for the creation of aggregated acceleration entities at CERCA centres will be published in 2018 - A call for proposals for grants for R&D&I networks will be published in 2018 - A call for proposals for grants for junior innovators will be published in 2018 - Other actions will also be planned in 2018
Expected results	- Greater alignment between the strategic actions of R&D&I stakeholders and companies - Increased technology transfer activities - Increased collaboration between universities and companies - Increased number of researchers who collaborate with companies - Increase in knowledge protection systems. - Enhanced technological capacity of companies in Catalonia, especially in cross-cutting enabling technologies - Improved positioning on the international market of companies in the leading sectoral areas

Through this programme, the Catalan Government provides financial support for actions aimed at increasing and optimising processes for the valorisation of knowledge, technology transfer and protection of the knowledge generated, as well as support and guidance for the creation of companies and public-private partnerships.

The aim of this instrument is to eliminate barriers between the scientific and business spheres, to enable the transfer of knowledge and technology and to create environments and models for relationships that facilitate fluid and dynamic collaboration.

Objectives

- To enhance instruments and processes of knowledge valorisation and transfer from scientific institutions in Catalonia to the economic, business and social world.

- To promote direct, stable collaboration between scientific institutions and companies.

- To facilitate the transition of collaboration in projects to association in order to develop joint research lines.

- To enable collaboration between research groups and SMEs.

Description

The programme revolves around the following lines of action:

1. Financial support for valorisation and knowledge transfer structures from Catalan universities

   - Support to implement plans for the improvement and optimisation of internal knowledge valorisation and transfer processes and instruments. Actions financed include creating or extending technology and patent portfolios; establishing or strengthening support systems for valorisation; legal guidance and support in transfer processes; and protection of knowledge and provision of specialised services.

   - The total amount of support available is 12 million euros.

2. Support for the creation of aggregated acceleration entities at CERCA centres

   - Support for the creation of aggregated acceleration entities at research centres of Catalonia (CERCA), to perform the functions of technology valorisation and transfer, and providing support and guidance for researchers, legal advice and support for the protection of knowledge, as well as any other measures that may be necessary.

   - The total amount of support available is 15 million euros.

3. R&D&I Networks

   - Grants for R&D&I networks that implement action programmes for the valorisation and transfer of research results to the business sector. These networks, which are formed by research groups from different organisations, conduct actions that, due to their cross-cutting nature, go beyond the possibilities for knowledge transfer of each individual group. This enables such networks to provide companies, especially SMEs, with integrated solutions to technological problems. The action programmes implemented by networks should also promote interdisciplinary and multidisciplinary approaches.

   - The total value of the grants is 6 MEUR, 50% of which is financed by the ERDF OP.

4. Junior innovators

   - International call for proposals for young entrepreneurs with potential for innovation, who will study for one year at universities and research centres in Catalonia. The programme is aimed at connecting the academic world with entrepreneurs just starting their professional careers. The long-term objective is two-fold: to identify technologies with sufficient commercial potential to generate emerging companies that can operate them; and to promote entrepreneurship at Catalan research institutions.

The total value of the grants is 1.6 MEUR, 50% of which is financed by the ERDF OP.

6. Knowledge Industry

Instrument	Annual competitive calls for proposals for support in the "seed" and "product" lines
Estimated value of projects	32 million euros
ERDF OP	12 million euros
Managing body	Agency for Management of University and Research Grants, (AGAUR)
Beneficiaries	Universities and research and innovation centres
Calendar	- The first call for proposals (0.65 MEUR from the ERDF OP for 33 beneficiaries) was published in 2014 and resolved in 2015 - The second call (1.26 MEUR from the ERDF OP for 40 beneficiaries) was published in 2016 and resolved in 2017 - A third call is planned (1.75 MEUR from the ERDF OP) for 2018 - Further calls for proposals are planned for 2019 and 2020
Expected results	- Increased technology transfer activities - Increase in the number of patents originating from universities and research centres - Increase in the number of technology-based companies emerging from the R&D&I system - Growing presence of entrepreneurs in research groups

The knowledge industry programme promotes two types of actions:

- Actions cofinanced with the ERDF OP to promote the valorisation and transfer of results from research conducted at universities and research and innovation centres ("seed" and "product").

- Actions aimed at encouraging entrepreneurism by granting credits to technology-based companies that originate from these institutions ("market").

Objectives

The objective of the programme is to significantly increase the valorisation of research results and technologies developed by research and innovation institutions, and to promote their transfer to the production sector, whether by improving the competitiveness of the existing system or by creating new technology-based companies.

Description

The lines of action included in the RIS3CAT strategy are known respectively as "seed" and "product". Both are operated by AGAUR.

1. Seed

   This line of action focuses on the first stage in the valorisation process (TRL technology readiness levels 1-2). From the know-how acquired from the research projects, ideas emerge that can be applied to new products, processes and services. A grant (maximum 25,000 euros) enables the research group to conduct the first feasibility tests, protect the knowledge generated and plan concept and design tests for the prototype.

   The support, up to a maximum of 25,000 euros, is awarded through competitive calls for proposals to researchers and research groups at universities, research centres and technology centres. These grants are complemented by entrepreneurship training programmes offered to one member of each team.

2. Product

   The "product" line of action centres on the concept and prototype test phase (TRLs 3-4-5). At this stage, the team needs to validate the technological reliability and feasibility of the product or process by designing and building prototypes that enable the necessary tests and trials to be conducted.

This instrument is implemented through annual competitive calls for proposals. The subsidy depends on the expenses eligible for the project and is worth a maximum of 100,000 euros. The beneficiaries of this line of action are also researchers and research groups at universities, research centres and technology centres.

7. Public procurement of innovation

Instrument	Cofinancing demonstration pilot projects in the field of innovative public procurement that provide a response to societal and environmental problems
Estimated value of projects	150 million euros
ERDF OP	75 million euros
Managing body	Coordination: Directorate-General for Economic Promotion, Competition and Regulation, Government of Catalonia, in cooperation with ACCIÓ Management of projects: Catalan Government ministries and Barcelona City Council, which manages 5 million euros from the ERDF OP
Beneficiaries	The Government of Catalonia, its public sector and other public service providers that are beneficiaries of a call for proposals for support
Calendar	- Projects promoted by CatSalut and calls for proposals for grants for health pilot projects: there is a call for hospitals (16 MEUR from the ERDF OP) pending resolution, and a second is also planned - Under the Plan for Sustainable Road Surfaces of the Ministry of Territory and Sustainability, 11 MEUR from the ERDF OP will be tendered over the 2018-2019 period - The Ministry of Territory and Sustainability will publish a call for proposals for provincial governments in the field of innovation on the roads (surfaces and road safety) in 2018 - In the first half of 2018, the Catalan Waste Agency will publish a call for proposals for pilot projects for the selective sorting of municipal waste by local authorities (10 MEUR from the ERDF OP) - Other calls for proposals and projects will be launched over the 2018-2019 period
Expected results	- Increased involvement of government in the search for new solutions to the major economic and societal challenges, in cooperation with companies, R&D&I stakeholders and users of public services - Improvement in public services through the introduction of innovative solutions adapted to the new challenges facing society - Increased public and private investment in innovation - Increased relative weight of innovative public procurement in the purchasing activities of public administrations in Catalonia

Public procurement of innovation (hereafter, PPI) represents a radical change in the way the public sector purchases goods and services. Through PPI, governments can request products and services that do not exist on the market, in this way opening up new opportunities for companies, which need to innovate in order to offer new solutions to improve public services.

Objectives

The main objective of this programme is to promote innovation in public services in order to enable public authorities to make more effective and efficient responses societal and environmental challenges. To achieve this goal, the public administration must become actively involved in innovation, in cooperation with companies, R&D&I stakeholders and public service users.

Description

Within the framework of this programme, support is given to innovative and demonstration pilot projects that meet the following conditions:

- they must make a measurable and significant impact on improving the effectiveness and efficiency of public expenditure by the Catalan public administrations, and on improving public services,

- it must be possible to implement them in other public administrations, in Catalonia and other territories,

- they must make a measurable and significant impact on improving the competitiveness and capacity for innovation of SMEs in Catalonia, and

- they must take into account the entire life cycle of the product or service involved.

The programme prioritises innovative and demonstration pilot projects that respond to the health and social needs of the country and contribute to the transition to a circular economy.

The programme includes two main lines of action:

- Calls for proposals for support for demonstration pilot projects implemented by public service providers in the field of health.

- Sectoral plans promoted by Catalan Government ministries to implement demonstration pilot projects, primarily in the social sphere and in the field of the circular economy. If the sectoral plan permits, other public administrations of Catalonia may also participate.

8. Strengthening the technological capabilities of research and innovation infrastructures

Instrument	Competitive calls for proposals
Estimated value of projects	196,8 million euros
ERDF OP	98,4 million euros
Managing body	Directorate-General for Research, Government of Catalonia (The Ministry of Economy, Industry and Competitiveness contributes an amount equivalent to the ERDF OP subsidy to the call for proposals for singular scientific and technological infrastructure - ICTS)
Beneficiaries	Universities, research centres and major scientific facilities
Calendar	- The first calls for singular projects and for cooperative projects were resolved in 2016 (19.4 MEUR from the ERDF OP for 15 beneficiaries) - The (non-competitive) call for expressions of interest to promote singular scientific and technological infrastructure has been published: projects can be submitted until 31 December 2020 or until the resources assigned (19 MEUR from the ERDF OP) are exhausted; at April 2018, 8 MEUR have been requested from the ERDF OP, pending award of these funds, for 2 of the 3 potential beneficiaries - Preparations are underway for second calls for singular projects and for cooperative projects (60 MEUR from the ERDF OP)
Expected results	- Increased scientific and technological capacity of researchers at institutions devoted to research and innovation - Increased participation of researchers in European and national research and innovation programmes - Improved availability of technological capacity in the production system in order to meet its needs for innovation - Increased dissemination of cross-cutting enabling technologies and advanced technologies, and more intensive use of knowledge by the production system

Actions to enhance the scientific and technological capacities of research and innovation infrastructure, in order to such facilities more competitive from the point of view of science, innovation and technology transfer. Priority is given to projects with the greatest potential to generate competitive advantage and influence the country's socioeconomic development.

Objectives

- Increased participation of research and innovation system stakeholders in Catalonia in projects promoted by the Horizon 2020 programme, ESFRI and international and European networks.

- Increased impact of research and innovation infrastructure on the production system.

Description

Competitive calls for proposals of the following three types:

- For support for outstanding projects for the construction, acquisition, conversion or substantial extension of buildings for research and innovation infrastructure, particularly in RIS3CAT priority areas. Support will be awarded in accordance with criteria of excellence and with the goal of increasing the capacity of researchers to take part in projects in the Horizon 2020 programme, ESFRI and international and European networks.

- Support to create, build, acquire and improve scientific and technological platforms through cooperative projects, with a view to making a shared use of these facilities.

Call for expressions of interest to develop "singular scientific and technological infrastructures" (ICTSs), shared by the State General Administration and the Catalan Government. There are three ICTSs at present: the Alba Synchrotron - CELLS Consortium; Barcelona Supercomputing Centre - National Supercomputing Centre (BSC-CNS); and the National Centre for Genomic Analysis (CNAG).

9. Digital Innovation Hub de Catalunya (DIH-CAT)

Instrument	Competitive calls for proposals for grants for digitalisation ecosystem players and creation of a digital tool to articulate DIH-CAT
Estimated value of projects	According to initiatives and projects
ERDF OP	15 million euros
Managing body	Secretariat for Telecommunications, Cybersecurity and Digital Society, Directorate-General for Economic Promotion, Competition and Regulation, Government of Catalonia, and ACCIÓ.
Beneficiaries	Digitalisation ecosystem players
Calendar	- A digital tool to articulate DIH-CAT will be developed in 2018 - Calls for proposals are planned for the 2018-2019 period
Expected results	- Increased digitalisation of SMEs in Catalonia - Articulation, reinforcement and raised profile of the DIH-CAT ecosystem - Enhanced position of DIH-CAT in the European DIH network

Digital innovation hubs (hereafter, DIHs) can be considered regional ecosystems, involving very different stakeholders, which enable companies to gain access to specialised support to help them understand how digital technologies affect them, how they can access these technologies and how they can promote and finance the necessary investments to conduct the digital transformation of their business. The central element of DIHs are competence centres, which act as connectors between all the regional players involved. Competence centres are facilities for training and experimentation in digital technologies for companies. The other DIH players focus on intangible infrastructure, aimed at providing business services, including both technological and financing consultancy. DIHs also include SMEs, large enterprises, emerging companies, accelerators, investors and researchers.

In the period following 2020, DIHs will play a major role in research framework programmes and RIS3 strategies. The Catalan Government is co-designing the DIH model for Catalonia in cooperation with the main stakeholders.

Objectives

- To establish a network of DIH-CAT competence centres with its own brand and system of governance, and to articulate digitalisation ecosystems for areas of specialisation.

- To develop a digital tool for DIH-CAT that operates as a digitisation services market and enables DIH-CAT activities and their impact to be monitored.

- To increase the digitisation of SMEs in Catalonia.

- To strengthen the positioning of DIH-CAT centres in European networks.

Description

The following actions are planned within the framework of this instrument:

- The development of a digital tool to integrate, process, visualise and explore data that enables DIH-CAT ecosystem players to be identified, characterised and classified, both by service and sectorial and technological specialisation. This tool will also serve as a digitisation service market and will provide a "one-stop shop" for SMEs seeking access to digital services.

- The publication of a competitive call for proposals to strengthen available technology and at DIH-CAT competence centres.

The publication of a competitive call for proposals to promote the digitisation of the business system.

10. Catlabs programme

Instrument	Combination of various instruments
Estimated value of projects	4 million euros (this may vary according to projects and cofinancing with FEDER)
ERDF OP	2 million euros
Managing body	Secretariat for Telecommunications, Cybersecurity and Digital Society, and Directorate-General for Economic Promotion, Competition and Regulation, Government of Catalonia
Beneficiaries	Government of Catalonia and stakeholders engaged in digital social innovation
Calendar	- Pilot call for proposals for social, digital and collaborative innovation projects, planned for the second half of 2018 (depending on the results, more calls could be launched) - Direct Catalan Government actions to support the Catlabs Network and promote social, digital and collaborative innovation throughout the ERDF OP operational period
Expected results	- Increase in number of players who take part in innovation and users of digital social and collaborative innovation facilities - Increase in the involvement of universities, schools, research and technology centres and other innovation stakeholders in the challenges facing the territory and citizens - Increase in the amount of innovations that respond to the challenges facing Catalan society - Increase in the number of people trained in digital technology who take part in innovation projects and, as a result, improve their employability - Consolidation of Catalonia as a reference in digital and collaborative social innovation in Europe - Advance towards universal innovation system open to all (collaborative)

In recent decades, the generalised use of ICTs and the Internet have made possible the appearance and consolidation of open and collaborative models of innovation in which users (citizens) and digital technologies play a central role. It is in this context that collaborative innovation between public administrations, companies, R&D&I stakeholders and civil society has become key to developing new responses to complex societal challenges of society, that is to say, systemic challenges.

Articulating these responses is intrinsically complex, since it often requires wide agreement and involves changes in behaviour and ways of going about things at all levels of society.

In this context, open innovation structures, citizen laboratories and so on have emerged around the world in recent years. These initiatives enable citizens to gain access to innovation and help to articulate collaborative projects between public administrations, R&D&I stakeholders and civil society to co-design innovative responses to challenges facing the territory.

Objectives

- To promote the articulation of a network of social, digital and collaborative innovation in Catalonia (the Catlabs network) to generate and share knowledge and resources and to formulate innovative responses to societal challenges.

- To advance towards a universal system of innovation adapted to the Internet age (collaborative).

- To develop and implement dynamic, participatory processes focused on learning and collective impact.

Description

The CatLabs programme promotes the organisation of a Catalan digital and collaborative social innovation network that involves the country's economic and social fabric as a whole in innovation processes, adopting the model of the quadruple helix (R&D&I system, companies, government and innovation users).

The programme is jointly promoted and coordinated by the ministries of the Presidency and the Vice-Presidency and Economy and Finance. Other bodies involved in the initiative are the Ministry of Business and Knowledge; the Ministry of Agriculture, Livestock, Fisheries and Food; the Ministry of Education, and the Catalan Employment Service (SOC).

The Catalan Government drafts new versions of the CatLabs programme action plan annually, in cooperation with the stakeholders involved, in a process of co-creation.

In 2017, work centred on identifying agents of social, digital and collaborative innovation in the territory. Work and co-creation sessions were organised with these agents, local authorities and universities, and advances were made towards defining the figure of the agent for social and digital innovation at the local level and in co-designing pilot projects. Progress was also made in analysing the implications for the public administrations of the new paradigm of open science and innovation.

In 2018, work focuses on the following areas: methodology, training and support, for both public administrations and innovation agents; promoting and supporting social, digital and collaborative innovation projects aimed at resolving complex challenges in the territory with the involvement of the quadruple helix and within the framework of a pilot call for proposals; articulating and strengthening the network of social, digital and collaborative innovation agents; and establishing and organising the FPLabs network of vocational training centres, promoted by the Ministry of Education.

11. Collaborative projects in the field of the advanced digital technologies

Instrument	Competitive calls for proposals for support for collaborative R&D&I projects in advanced digital technologies that provide responses to the challenges facing the country
Estimated value of projects	20 million euros
ERDF OP	10 million euros
Managing body	Secretariat for Telecommunications, Cybersecurity and Digital Society, Government of Catalonia
Beneficiaries	Public and private stakeholders in the research and innovation system, companies with operational bases in Catalonia, and public administrations
Calendar	A first call for proposals is planned for 2018 (5 MEUR from the ERDF OP) and a second in 2019 (5 MEUR from the ERDF OP)
Expected results	- Increased public and private investment in R&D&I in the field of advanced digital technologies and, and an increase in their economic and social impact - Positioning of Catalonia in Europe in the development of advanced digital technologies - Generation of economic activity in the emerging digital sectors and creation of highly qualified jobs - Increased cooperation between quadruple helix stakeholders (public administrations, universities and stakeholders in the research and innovation system, companies and users) to respond to the technological challenges facing the country

Collaborative R&D&I projects in the field of the advanced digital technologies, promoted by groups of R&D&I stakeholders, companies and, in certain cases, public administrations, to provide responses to previously-identified challenges facing the country.

Objectives

- To generate new economic opportunities and job creation in emerging areas that have high growth potential.

- To contribute to the consolidation of a digital innovation hub in Catalonia that can become a reference in the European Union.

- To promote cooperation among quadruple helix stakeholders (R&D&I system, companies, governments and users) in developing innovative solutions that respond to the challenges facing Catalan society.

- To promote medium- and long-term R&D&I work programmes in the field of the advanced digital technologies in order to respond to previously-identified challenges facing the country.

Description

Public calls for proposals to develop projects in advanced digital technologies that can provide a response to the challenges facing the country. Activities forming part of projects that are eligible for subsidies are:

- Applied research, experimental development and demonstration project development.

- Technology valorisation projects to transfer the knowledge of stakeholders to the research and innovation system.

- Establishment of experimental advanced digital technology platforms, and actions involving the evaluation and experimental validation of prototypes.

The projects, selected in competitive calls for proposals, have a duration of from one to three years.

12. Innovation projects by the Public Administration within the framework of open science and innovation paradigm

Instrument	Innovation projects focused on transforming the model of relations between the public administration and citizens and R&D&I system stakeholders. These projects will enable advances to be made towards the model of open science and innovation paradigm promoted by the Government of Catalonia and Barcelona City Council within the framework of the cooperation agreement with the Catalan Government to develop RIS3CAT and the ERDF OP).
Estimated value of projects	70 million euros
ERDF OP	35 million euros
Managing body	Coordination: Directorate-General for Economic Promotion, Competition and Regulation, Government of Catalonia Management of projects: Catalan Government ministries and Barcelona City Council
Beneficiaries	Government of Catalonia, Barcelona City Council and companies and stakeholders in the research and innovation system
Calendar	The whole ERDF OP period
Expected results	- Creation of a new generation of public services centred on users' needs - Consolidation of the Catalan public administrations as leaders in the introduction of innovations in public services aimed at improving the wellbeing of citizens - Projection of Catalonia as an international leader and pole of reference in the development of innovative solutions that generate social and economic impact through new knowledge - Availability of new open data integration and visualisation tools in environments characterised by large volumes of information. This will enable the generation of new evidence to aid decision making within a framework of more participatory governance, and an increase in the social and economic impact of public policy - Consolidation of the "Barcelona" brand as a pole of digital innovation and a global benchmark in urban innovation

Objectives

- To develop innovative solutions focused on the needs of the citizens, in cooperation with R&D&I stakeholders, supply companies and service users.

- To improve public services by developing advanced, innovative solutions.

- To improve the user experience of public services.

- To promote the development and competitiveness of companies in Catalonia through public demand for innovative solutions.

- To improve the availability of information through open data, mass data and unstructured data, using integration and advanced visualisation tools.

Description

To advance towards the paradigm of open innovation and science, it is essential for the public administration change the way it relates to citizens and stakeholders. Citizens demand and expect the public sector to be an active part in innovative solutions to the challenges that face our society today, and to guarantee public services and quality employment. Similarly, citizens demand new spaces for participation and co-responsibility in the design and implementation of these innovative solutions to present challenges. In order to effect this change in the public administration's relations with society, it is necessary to renew processes for the design, implementation and evaluation of public policy through social innovation and close cooperation with all the actors involved.

The Government of Catalonia's first actions in the framework of this instrument are:

- Testing the concept of the digital platform Smart Specialisation Mapping of Catalonia (RIS3-MCAT) to monitor the smart specialisation process in Catalonia. This tool enables mapping of the collaboration of R&D&I players and companies in Catalonia that take part in selected projects through competitive calls for proposals, segmentation by RIS3CAT sectoral area and technology, and analysis of trends and research and innovation communities in emerging fields.

- Project for innovation and transformation of systems managing relations between the Catalan Tax Agency and taxpayers, adopting a digital model that includes the following elements: single-channel, customised and proactive services; systemic, citizen-centred vision; integrated digital solutions, based on data evidence; citizenship participation and co-creation of services; and risk management.

- Promotion of the development of innovative solutions focused on improving the welfare of citizens and the sustainability of the health system.

The main lines of action of Barcelona City Council, set out in the programme "Smart city initiative for the development of urban public services", in the framework of the cooperation agreement with the Government of Catalonia for the development of the RIS3CAT, are as follows:

- Development of management systems and models and provision of public services within the framework of City OS, fog computing and the management and operation of mass data generated in the urban environment by sensors distributed in spaces, facilities, furniture and vehicles.

- Development of systems to provide services based on new platforms and mobile telephony, including means of identification and interaction with administrative validity and new models of transparency and citizen participation.

- Development of innovative general and specialised social care and assistance services based on data management, systems integration and the application of new technologies and procedures associated with information processing.

- Development of innovative systems in the sustainable urban management of tourism.