

RIS3CAT Monitoring

4. RIS3CAT Monitoring System

February 2019

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1. Introduction

Research and innovation strategies for smart specialisation (hereafter, RIS3) are a key element in the Europe 2020 strategy for smart, sustainable and inclusive growth. In its decided commitment to make knowledge and innovation a priority, the European Union has called on governments to develop RIS3 to ensure that investment in research and innovation financed by European funds is consistent and maximises impact on economic and social development in specific territories and in Europe as a whole. Accordingly, for the 2014-2020 period, all research and innovation actions financed by the ERDF must be framed within RIS3. In the case of Catalonia, this strategy is implemented within the framework of RIS3CAT, the Research and Innovation Strategy for the Smart Specialisation of Catalonia, approved by the Catalan Government in 2014.

The implementation of RIS3CAT has highlighted the need to strengthen the role of government as a driver of innovation and social transformation through policies aimed at mobilising the knowledge and capacities available in the territory in order to generate new responses to societal challenges. To this end, through RIS3CAT, the Catalan Government promotes public policies and projects that articulate the efforts of different social stakeholders aimed at developing new responses to the complex challenges that face society. These are collective challenges that have different, interrelated causes and which, therefore, cannot be addressed by just one single institution, as the possible solutions usually involve paradigm shifts at various levels, including changes in people's and organisations' behaviour.

The learnings generated by experience and analysis of the policies and projects implemented within the RIS3CAT framework revealed the need to review the previous version of the RIS3CAT monitoring system (January 2017).

Section 2 below describes the basic characteristics of RIS3 monitoring systems. Section 3 explains the aims and the structure of the RIS3CAT monitoring system.

Section 4 describes the sources of information and the quantitative and qualitative indicators used to monitor RIS3CAT projects and instruments. Section 5 presents the RIS3-MCAT Platform to monitor the smart specialisation. Finally, Section 6 presents the impact analysis of RIS3CAT actions: the contribution to the RIS3CAT strategic objectives; the contribution to the ERDF Operational Programme Catalonia 2014-2020; and the contribution to the smart specialisation process, public policies and the collaboration of quadruple helix stakeholders.

2. The RIS3 framework

RIS3 strategies are agendas for economic transformation in which innovation and knowledge are the drivers. These strategies are characterised as follows:

- Prioritisation, that is, selection of a limited number of priorities according to the strengths and international specialisation of the territory.
- Strengthening competitive advantages, mobilising talent and adapting R&D&I capacities to the needs and capacities of the business system in the territory.
- Critical mass of resources and talent, and intersectoral and interregional cooperation, to stimulate specialised diversification and avoid duplication and fragmentation.
- Collaborative leadership, which requires the active participation of government, research and innovation players, companies and civil society in the innovation system, as well as the generation of synergies between different sources of financing: European, state, regional and local, public and private.

These transformation agendas are articulated through so-called “entrepreneurial discovery processes”. Discovery processes are bottom-up approaches in which government, companies, research and innovation players and civil society in a particular territory (hereafter, quadruple helix stakeholders) identify the areas of specialisation in that territory and then design and implement programmes, actions and projects to strengthen them.

The discovery processes that the European Commission aims to encourage through RIS3 strategies require dynamic, participatory monitoring systems, focused more on strategic learning than on achieving pre-established objectives. These monitoring systems should help to reveal the contribution made by actions to achieving the strategic objectives shared by different stakeholders. Accordingly, the key elements include: governance, to articulate the efforts made by the key stakeholders involved, strengthen synergies and maximise collective impact; and a common system of indicators and monitoring that provides dynamic information to enable decision making.

This vision of RIS3 strategies as dynamic, participatory agendas of economic and social transformation in a territory imply the following conditions as regards the monitoring system applied to them:

- Monitoring systems should be **dynamic**, that is, they should evolve as the design and implementation of the strategy advances.
- They should focus on **strategic learning** and promote the adaptation of the strategy and its instruments as new challenges and opportunities are identified.
- They should be **participatory**, that is, the cooperation of the stakeholders involved in the strategy is required.
- They should enable measurement and evaluation of the **results** and **impact** on complex, dynamic environments.

The monitoring system should be planned from the moment that the design of the strategy begins. However, as a dynamic strategy in evolution is involved, the questions that this monitoring system should answer also evolve over time (see Table 1). The participation of stakeholders and the combination of different sources is key to obtaining the relevant information to enable actions carried out within the framework of the strategy to be adapted and made more effective.

RIS3 monitoring systems should take into consideration both accountability and strategic learning (see Table 2):

- The aim of accountability, generally a condition of European funds, is to assess the degree to which predetermined objectives established in a predefined plan are effectively achieved.
- Strategic learning combines information and data from different sources and in different formats in order to adapt the strategy to a complex, dynamic environment and with the aim of increasing its impact.

Table 1. Dynamic monitoring system focused on strategic learning

	Early and middle years	Middle years	Late years
What is the focus?	What do we want to happen?	What works and what does not work?	What is the impact?
What is happening?	<p>Key stakeholders co-design the strategy and action plan. They explore and propose different possible options.</p> <p>There is a degree of uncertainty about what will work and what will not work.</p> <p>New questions, challenges, and opportunities emerge.</p>	<p>The first calls for proposals have been approved and the stakeholders have begun to implement their projects.</p> <p>Outcomes are becoming more predictable.</p> <p>New problems and new opportunities are detected.</p> <p>The results can be better predicted.</p> <p>The context of the strategy is better known and understood.</p> <p>Learnings are incorporated and the strategy adapted.</p>	<p>Some projects have ended, while others are still at the execution stage.</p> <p>Stakeholders have significant experience and more certainty about how things work.</p> <p>The impact of the strategy can be evaluated.</p> <p>Learnings are incorporated and the strategy adapted.</p>

Source: Directorate-General for Economic Promotion, Competition and Regulation.

Table 2. Accountability and strategic learning in RIS3 monitoring

	Accountability	Learning
Focus	Controlling the use of public money and getting best value for money.	<p>Understanding what works and what doesn't work and why.</p> <p>Understanding the patterns of specialisation and opportunity (stakeholders' investment priorities, interactions, emerging activities, etc.).</p>
Indicators, data and tools	Quantitative indicators: results indicators (from statistics, surveys, administrative data) and output indicators (from projects).	<p>Qualitative indicators (working groups or surveys of stakeholders) combined with quantitative indicators.</p> <p>Open Data, Big Data and Thick Data, integrated into tools that map and visualise R&D&I ecosystems and their complex networks of interaction and cooperation.</p>

	Accountability	Learning
Goals	Demonstrating the capacity to achieve results in dynamic environments (not achieving predetermined results from a predetermined plan).	To provide evidence to develop and implement more effective solutions to economic and societal challenges in the territory (public policy, investment, etc.) and to formulate new narratives that can influence both the stakeholders involved and public policy, and can generate a new collaborative dynamic.

Source: Directorate-General for Economic Promotion, Competition and Regulation.

Traditional indicators –statistical sources, surveys, administrative data and so on– alone are not sufficient to monitor RIS3 strategies. In addition to these, qualitative indicators, obtained directly from the stakeholders involved, should also be used. Open Data and Big Data have also become important sources of information for understanding how research and innovation ecosystems evolve.

Combining data compiled from very different sources requires a new generation of digital tools that enable the data obtained from research and innovation systems –data which is, by definition, dynamic and complex– to be crossed and interpreted. This will generate new evidence to inspire new public policies and new forms of cooperation among quadruple helix players, always with the aim of maximising collective impact, in both economic and social terms (shared value).

3. Objectives and structure

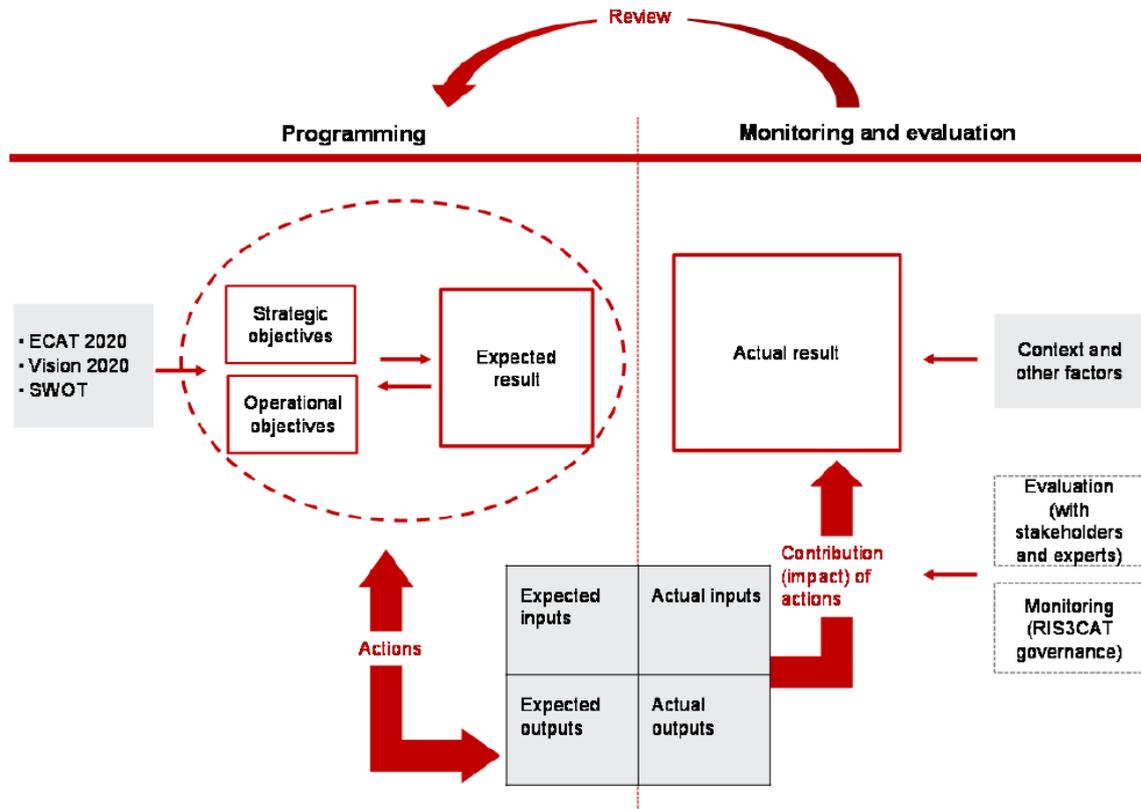
The main objectives of the RIS3CAT monitoring system are as follows:

- To guide the design, implementation and evaluation of RIS3CAT in order to guarantee the efficient use of public resources and maximise their impact.
- To provide information that can facilitate necessary decision making to enable stakeholders to adapt their strategy, instruments and projects to a changing environment.

The information gathered within the framework of the RIS3CAT monitoring system is key to ensuring the good governance of the strategy: it enables the bodies that manage the instruments involved to identify and analyse factors that make it easier or more difficult to achieve the desired results and to introduce improvements in design and implementation; and it enables RIS3CAT governance bodies to identify and act on margins to improve the design and implementation of the strategy as a whole, according to the system shown in Graph 1.

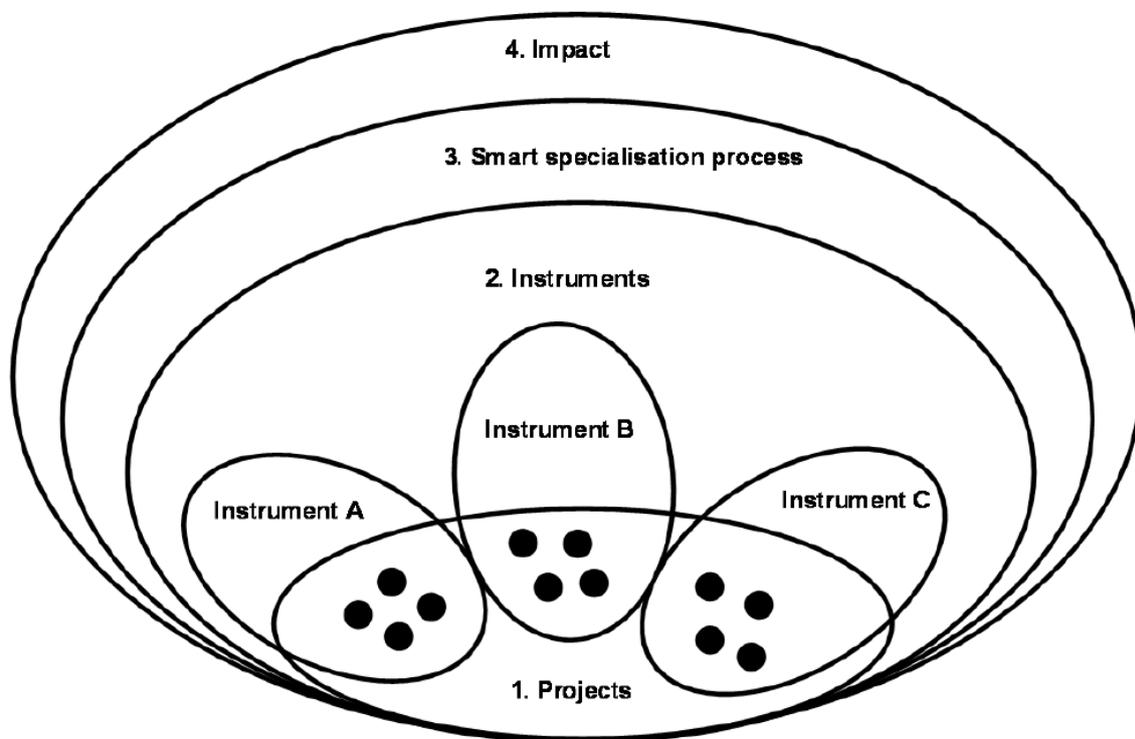
The RIS3CAT monitoring system is structured around four levels: projects, instruments, smart specialisation process and impact (see Graph 2). The sections that follow contain descriptions of the information used at each of these levels.

Graph 1. RIS3CAT monitoring and governance



Source: RIS3CAT Action Plan.

Figure 2. Schematic diagram of the RIS3CAT monitoring system



Source: ESPARZA MASANA, Ricard; FERNÁNDEZ SIRERA Tatiana; CASTELLANOS MADUPELL, Albert. *Learning by monitoring: A practical approach based on the smart specialisation strategies*. Working document presented at the 1st SMARTER Conference on Smart Specialisation and Territorial Development (Seville, 28-30 September 2016).

4. Projects and instruments

The main sources for monitoring the projects and instruments of the RIS3CAT are: quantitative indicators on project implementation; and qualitative information about projects.

4.1. Project implementation indicators

RIS3CAT has a system of indicators common to all instruments and projects. These indicators are classified into two categories:

1. Innovation and knowledge indicators (see Table 3).
2. Sustainable growth indicators (see Table 4).

Innovation and knowledge indicators focus on the following points:

- Improving the research and innovation system and, more specifically, intensifying cooperation between research and innovation system stakeholders and companies.
- Creating emerging technology companies.
- Valorising knowledge and technology and applying them in the production system.
- Internationalisation.

Indicators on sustainable growth provide information about the competitiveness of the productive system, business dynamism and efficient use of resources.

Reports on the implementation of RIS3CAT projects are published periodically.

Table 3. Innovation and knowledge indicators

Indicator	Definition
Public and private investment in R&D&I	Public and private investment in RIS3CAT actions, number of projects, number of R&D&I stakeholders, number of researchers and number of companies
Collaborative R&D&I projects	Public and private investment in collaborative R&D&I projects, number of projects, number of R&D&I stakeholders, number of researchers and number of companies
Projects to improve processes and management	Investment in projects to improve processes and management, number of projects, number of R&D&I stakeholders, number of researchers and number of companies
Innovation public procurement projects	Budget for innovative public procurement projects, number of contracts number of R&D&I stakeholders, number of companies
Companies that use platforms and infrastructure cofinanced with the ERDF	Companies that use or commission infrastructure and facilities cofinanced with the ERDF
Startups	Companies created by entrepreneurs (not corporations) that have been in operation for a maximum of ten years, implementing a business model that can be repeated and applied in global environments and willing to give some of their shares in exchange for injections of cash that will enable them to grow more quickly
Patent applications and registrations	Patents applied for or registered by R&D&I stakeholders and companies as a result of RIS3CAT projects
Brands created and registered	Brands created or registered by R&D&I stakeholders and companies as a result of RIS3CAT projects
Companies that innovate	Companies that innovate as a result of RIS3CAT projects
Projects complementary to Horizon 2020 projects and those of other European competitive programmes	RIS3CAT projects linked to Horizon 2020 projects and those of other European competitive programmes

Source: RIS3CAT Action Plan.

Table 4. Sustainable growth indicators

Indicator	Definition
Jobs created	Jobs created within the framework of RIS3CAT actions
People that receive training within the framework of RIS3CAT projects	People that receive training within the framework of RIS3CAT actions
Companies with increased revenues	Companies that increase their revenues as a result of RIS3CAT projects
Companies with increased exports	Companies that increase their exports as a result of RIS3CAT projects
Companies with new international business opportunities	Companies that with new international business opportunities as a result of RIS3CAT projects
Companies that increase productivity	Companies that reduce costs as a result of RIS3CAT projects
Companies that have introduced innovations to reduce water consumption	Companies that introduce measures to improve efficiency and saving in the use of resources through participation in RIS3CAT projects
Companies that have introduced innovations to reduce energy consumption	
Companies that have introduced innovations to reduce CO2 emissions	
Companies that have introduced innovations to reduce waste (recycling, eco-design)	
Projects linked to the circular economy	RIS3CAT projects that contribute to the circular economy

Source: RIS3CAT Action Plan.

4.2. Qualitative information on projects

In monitoring RIS3CAT projects and instruments, qualitative information is at least as important or more than that provided by quantitative indicators.

The bodies that manage RIS3CAT calls for proposals and instruments conduct continuous monitoring of projects in cooperation with the stakeholders that implement them. This information (which is often compiled in an unstructured way), is used to identify and analyse factors that contribute positively or negatively to achieving results, and enables the introduction of improvements in the design and implementation of both

the instruments and the strategy. The RIS3CAT Action Plan is updated regularly on the basis of this information.

One of the main challenges identified in the implementation of the RIS3CAT Action Plan over the first few years is the difficulty in effectively and efficiently harmonising all the different elements involved:

- The needs or requirements of the production and research and innovation systems (efficiency, flexibility and adaptability).
- Ambitious instruments to support collaborative research and innovation, aimed at reinforcing stakeholders' collaboration to improve the efficacy and performance of the research and innovation system.
- Highly inflexible and excessively lengthy administrative requirements and processes, largely derived from the regulations governing subsidies and the structural funds and the organisation and operation of the public administrations involved.
- A political and economic context that has made it more difficult for government to cofinance actions.

In order to systematically collect qualitative information that can serve as the basis for drawing up the RIS3CAT strategy for the 2021-2027 period, the Catalan Government, in cooperation with organisations and stakeholders taking part in RIS3CAT or European projects, has launched the following lines of action:

- Analysis of the social, economic and environmental challenges that projects financed with European funds help to resolve and exploration of how these challenges can become a driver for the engagement and collaboration of government, research and innovation players, companies and civil society.
- Exploration of participatory formulas for governance that promote and enable cooperation between different stakeholders, both in a particular territory and between territories.

- Exploration of ways to apply the responsible research and innovation approach to RIS3CAT.
- Exploration of formulas to ensure that solutions developed and tested at local level can be adopted at regional, national or European level (as appropriate).
- Development of methodologies to enable government to work on challenges and missions, taking a systemic approach and in cooperation with stakeholders.
- Enhancement of public procurement as an instrument for implementing more effective responses to societal challenges.
- Exploration of strategies and formulas that enable government to promote the development of business models that generate shared value.
- Exploration of formulas that generate synergies and complementarities between European projects financed by different sources and programmes, maximising their impact.

These lines of action are implemented with both RIS3CAT stakeholders and stakeholders from other European territories within the framework of Interreg Europe projects linked to RIS3CAT (see the document [Proposal to enhance the complementarity between the Interreg Europe programme and RIS3](#)), the SeeRRI (Building Self-Sustaining Research and Innovation Ecosystems in Europe through Responsible Research and Innovation) European project and the Panoraméd project. The results will be disseminated through case studies and good practice, methodological manuals and reports, planned for publication beginning in the second half of 2019.

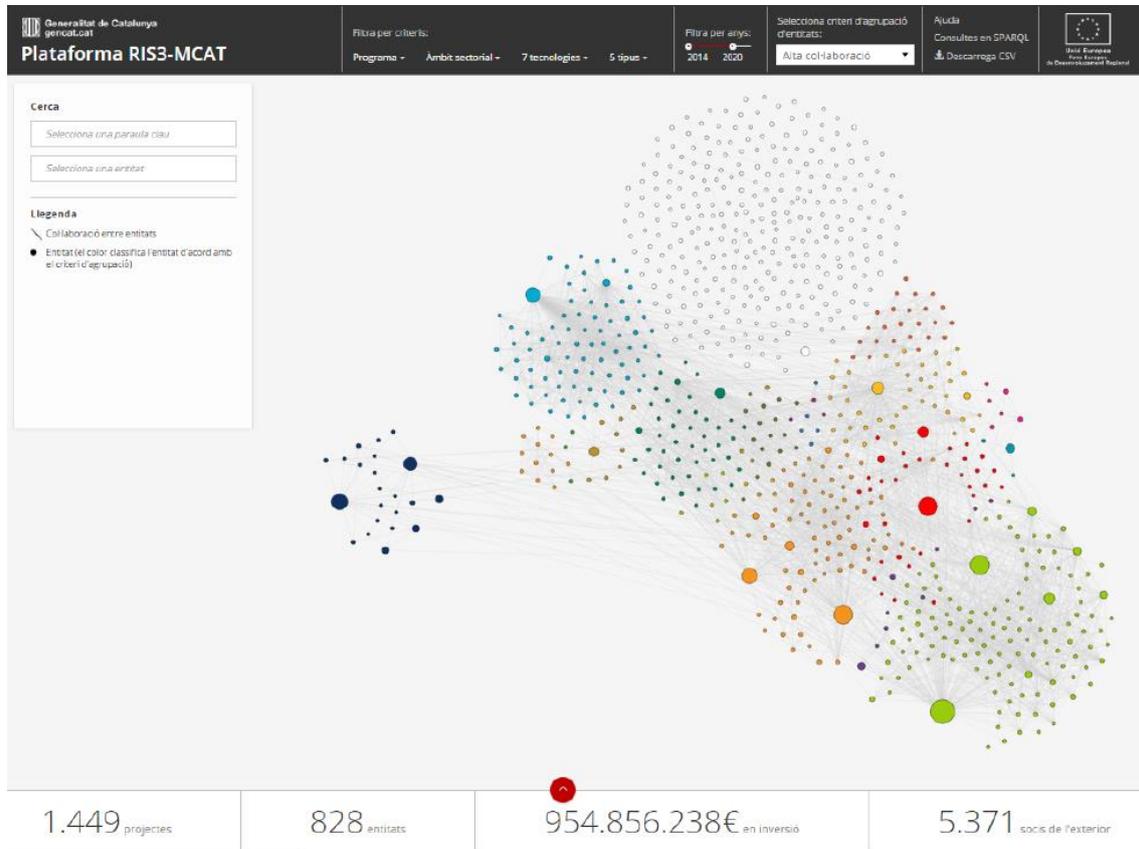
5. Smart specialisation

Smart specialisation is monitored through information provided by the [Platform for Mapping Smart Specialisation of Catalonia](#) (RIS3-MCAT Platform). This Platform is an open government, artificial intelligence, data visualisation project that integrates, interrelates and makes interoperable open data from research and innovation financed by European funds in Catalonia. The RIS3-MCAT Platform aims to contribute to the following objectives:

- Understanding the impact of European funds on the specialisation of the research and innovation ecosystem in Catalonia, both in terms of sectoral and technological specialisation and the detection of emerging activities.
- Identifying opportunities to maximize the collective impact of research and innovation in Catalonia, based on synergies and coordination of efforts.
- Providing new evidence to enable decision-making by stakeholders in the research and innovation ecosystem in Catalonia, promoting new cooperation dynamics and inspiring new public policies.
- Raising the profile of Catalan organisations that participate in European research and innovation networks.
- Understanding how European funds contribute to providing innovative responses to the challenges that face our society.

The RIS3-MCAT Platform is an interactive tool that enables exploration of the interrelations between partner organisations engaged in research and innovation projects financed by European funds (see Graph 2). The tool autodetects networks of innovative communities in Catalonia, enabling users to filter them by sector, technology, programme, instrument, type of organisation, territory and keyword.

- **Graph 3. The RIS3-MCAT Platform**



Source: Directorate-General for Economic Promotion, Competition and Regulation.

Still at the proof of concept stage, the Platform enables users to map and characterise the activity of Catalan organisations in the Horizon 2020 programme and in the RIS3CAT instruments of RIS3CAT communities and R&D cooperation projects. The Platform:

- Dynamically maps the relations between organisations in the Catalan R&D&I system and detects the configuration and evolution of innovative networks and communities in the different spheres of specialisation.
- Dynamically maps the cooperation of Catalan organisations with international partners within the framework of the Horizon 2020 programme.

- Shows the evolution over time and the geographic distribution of projects and stakeholders in the R&D&I ecosystem of Catalonia.
- Enables users to explore areas of research and innovation in Catalonia through more than 15,000 keywords.

Over the course of 2019, the information available on the Platform will be improved and its functionalities expanded. The Platform will enable analysis by challenge of projects financed with European funds, helping to answer such questions as: *How do European funds contribute to developing innovative responses to societal challenges? and, Do projects that are financed with European funds address challenges that society believes are the most urgent and important?*

6. Impact

The Plan for Specific Evaluation of the ERDF Operational Programme Catalonia 2014-2020 establishes the basic parameters for evaluating the impact of the RIS3CAT Action Plan 2015-2020, which focuses on three lines of action:

- Contributing to actions aimed at achieving the long-term strategic objectives established in RIS3CAT.
- Contributing to the priority areas in the ERDF Operational Programme Catalonia 2014-2020.
- Contributing to the process of smart specialisation, public policy and the cooperation of the quadruple helix.

Intermediate evaluation of RIS3CAT and the ERDF Operational Programme Catalonia 2014-2020 will be carried out in 2019, and a report published. The final evaluation will be made in 2023.

6.1. Long-term strategic objectives of RIS3CAT

The long-term strategic objectives of RIS3CAT are as follows:

- To strengthen the competitiveness of the business system by improving the efficiency of production processes, internationalisation and the reorientation of consolidated sectors towards activities with greater added value.
- To promote new emerging economic activities based on research, creativity and innovation, to establish and exploit new market niches.
- To consolidate Catalonia as a European hub for knowledge and the connection of technological and creative capabilities with existing sectors in the territory and with emerging sectors.
- To enhance the Catalan innovation system generally, increasing the competitiveness of companies, especially SMEs, and orienting public policy towards the promotion of innovation, internationalisation and entrepreneurship.

6. Impact

Table 5. RIS3CAT results indicators

Indicator	Objective	Starting point		Source
		Figure	Year	
1. R&D as % of GDP	2%	1.52%	2015	INE
2. % of private sector spending in total R&D ¹	67%	57.10%	2015	INE
3. % companies that introduce technological innovations ²	20%	15.40%	2013-2015	INE
4. Number of companies that take part in Horizon 2020 Programme projects (base 100) ³	113	100	2015	CDTI
5. % researchers employed in the private sector ⁴	42%	40.10%	2015	INE
6. Number of start-ups	–	1,107	2016	ACCIÓ
7. % participation in Horizon 2020 (EUR)	2.45%	2.45%	2015	CDTI
8. Standardised impact of scientific production in Catalonia	1.53	1.44	2006-2010	SCImago
9. % companies that develop or have acquired R&D ^{5,6}	22%	24.1%	2015	Barometer on Innovation in Catalonia
10. % companies that innovate ^{5,6}	60%	54.0%	2015	Barometer on Innovation in Catalonia
11. % companies that innovate in cooperation with other companies or R&D&I stakeholders ^{5,7}	55%	50.1%	2015	Barometer on Innovation in Catalonia
12. % companies that innovate in cooperation with international companies or R&D&I stakeholders ^{5,7}	60%	58.3%	2015	Barometer on Innovation in Catalonia
13. % innovative companies that implement innovative activities abroad ^{5,7}	30%	19.3%	2015	Barometer on Innovation in Catalonia
14. % companies that use risk capital to finance investment in innovation ^{5,7}	2.5%	1.3%	2015	Barometer on Innovation in Catalonia

1. Calculated by ACCIÓ based on INE data.

2. Percentage of the total companies with more than nine employees.

3. Number of beneficiary companies (may have participated in one or more projects).

4. Percentage of total research personnel in Full-Time Equivalent (FTE), calculated by ACCIÓ based on INE data.

6. Impact

5. Barometer on Innovation in Catalonia, designed by ACCIÓ.

6. Percentage of the total companies with more than nine employees.

7. Percentage of total Innovative companies with more than nine employees.

Source: RIS3CAT Action Plan.

The contribution of RIS3CAT actions to achieving these objectives is quantified and analysed by monitoring performance indicators established for the strategy (see Table 5).

The sources of these indicators are official statistics, administrative data and specific surveys. The most important of these sources are as follows:

- Figures from the National Institute of Statistics (INE) and Eurostat on public and private investment in R&D by companies that implement technological innovations and researchers employed in the private sector.
- Administrative data provided by the Centre for Technological and Industrial Development (CDTI) on participation in the Horizon 2020 programme.
- Data provided by SCImago on the normalised impact of scientific production.
- Figures on innovation at companies provided by the Barometer on Innovation in Catalonia, Government of Catalonia Ministry of Enterprise and Knowledge (see Annex 1).
- Figures from the directory on emerging companies (Barcelona & Catalonia Startup Hub) drawn up by the Government of Catalonia Ministry of Enterprise and Knowledge (see Annex 2).

6.2. Impact on priority areas of the ERDF Operational Programme Catalonia 2014-2020

Actions under the RIS3CAT Action Plan 2015-2020 are cofinanced with the ERDF Operational Programme Catalonia 2014-2020 and, therefore, must focus on the priority areas of the OP, which are as follows:

- Innovation and knowledge
- Business dynamism

6. Impact

- Green economy and circular economy
- Territorial balance
- Employment
- Internationalisation

Table 6 highlights the main changes expected in each priority area, and which will enable the impact of the strategy to be evaluated.

The document Evaluation of the Objectives/Results of the ERDF OP Catalonia for the Annual Report, delivered in 2017, contains an analysis of the contribution of initial actions under the RIS3CAT strategy to achieving the objectives of the ERDF Operational Programme Catalonia 2014-2020.

Table 6. Contribution of RIS3CAT actions to priority areas in the ERDF Operational Programme Catalonia 2014-2020

Priority area	Expected changes
Innovation and knowledge	<ul style="list-style-type: none">• Increase in public and private investment in R&D&I• Increase in the number of companies that innovate• Increase in the number of researchers and companies that take part in collaborative R&D&I projects• Increased cooperation between universities and technology and research centres with companies• Increase in the number of technologically-based companies• Increase in the number of patents and marques registered• Increased participation in European competitive R&D&I programmes• Increase in the relative importance of innovative public procurement in Catalan public administrations
Entrepreneurism	<ul style="list-style-type: none">• Creation of new jobs• Increase in the number of companies that innovate• Improved competitiveness of companies that innovate (increased income, improved productivity, new business opportunities and reduction in costs)
Green economy and circular economy	<ul style="list-style-type: none">• Increase in the number of companies that innovate to reduce water and energy consumption, CO2 emissions and waste generation (eco-design and recycling)
Territorial balance	<ul style="list-style-type: none">• Introduction of smart specialisation strategies in the territory• Greater involvement of local players in innovation• Greater presence of innovation in ICT and territorial development strategies
Internationalisation	<ul style="list-style-type: none">• Increase in exporting companies• Increase in the number of companies with new business opportunities in the international market• Increased internationalisation of R&D&I

Priority area	Expected changes
Employment	<ul style="list-style-type: none">• Increase in employment, especially at companies that innovate

Source: RIS3CAT Action Plan.

6.3. Impact of the quadruple helix on smart specialisation, public policy and cooperation

Quantitative and qualitative information obtained from monitoring RIS3CAT should enable new knowledge to be generated on patterns of specialisation, emerging opportunities and cooperation and interaction between quadruple helix stakeholders (research and innovation actors, companies, government and civil society).

This new knowledge should enable stakeholders in the system to develop and implement more effective solutions to economic and societal challenges facing the country (public policy, investment, etc.) and to develop new narratives to articulate shared agendas for more sustainable development.

Measuring the impact of RIS3CAT in these areas is a challenge. As seen in Section 2, dynamic and participatory monitoring systems are required that take into account the complexity of the real situation in all its dimensions and interrelations. That is why the development and exploration of tools and indicators to capture the complexity of the situation is among the RIS3CAT lines of action.

Annex 1. Barometer on Innovation in Catalonia

The Barometer on Innovation in Catalonia, published periodically by ACCIÓ, is an initiative aimed at describing innovation in Catalonia, taking into account the new approach in latest studies, which no longer prioritise strictly technological criteria (basically, investment in research and development, and tangible aspects such as hardware, machinery, buildings and so on), but recognise the increasing weight of intangible assets (software, brand value and reputation, design, new digital tools, training, business models, etc.).

The Barometer on Innovation in Catalonia also compiles information in real and projected time, enabling it to act as an advance indicator and reduce the nearly two-year lag between the time information is gathered by official surveys and studies of the territory and the moment when it is actually published.

Accordingly, the main objective of the study is to provide direct information on the innovation process at Catalan companies in real time, taking into account the paradigm shift towards the increasing weight of intangible assets as a source for innovation and value creation at these companies.

The study also enables information to be gathered and analysed on management and systematisation of innovation, cooperation in innovation, the internationalisation of innovation, the financing of innovation and the results and impact of innovation for Catalan companies. Similarly, it also enables comparisons to be made between innovation processes at internationalised companies, which form part of global value chains, and non-internationalised companies and comparative study of processes at emerging and consolidated or mature companies.

Annex 2. Barcelona & Catalonia Startup Hub

[Barcelona & Catalonia Startup Hub](#) is an online directory of Catalan emerging companies (startups). The initiative was launched in response to the Government's decision to obtain a clear snapshot of this sector and promote its positioning.

The specific objectives of the directory are:

- To contribute to the positioning and international projection of the ecosystem of emerging companies in Barcelona and Catalonia.
- To raise awareness of emerging Catalan companies in the investment community in order to optimise these companies' capacity to attract investment.
- To strengthen the global presence of these companies so that they can increase sales and grow.
- To promote cooperation between emerging Catalan companies and large enterprises, so that the former become a source of cutting-edge technology for the latter.
- To obtain information on emerging Catalan companies in order to draft and implement public policy concerning this sector.

The information in this directory is progressively updated to include emerging companies as they are created, as well as foreign enterprises that establish subsidiaries in Catalonia. To enable this work, companies can register with the directory directly by completing an online form.