

## Becoming a Blue Country

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**Summary.** Catalonia has a research system with brilliant results whose applications strongly contribute to the Catalan economy. While Catalonia represents 0.1% of the world's population, it is responsible for 1% of the world's scientific output. Confronted with the knowledge revolution, the challenge that must be met by the country is to complete the massive transfer of this knowledge in the next ten years. Catalonia should become a Blue Country; that is, one with a profoundly democratic and cultured society with a high level of trust between its citizens, civil society and institutions. It should have powerful higher education and research systems that can provide Catalonia an economy with high added value. Scientists, by advancing knowledge and transforming it into value, will be the heroes of our time. They are the members of society who can lead us in becoming a Blue Country. [**Contrib Sci** 10:3-7 (2014)]

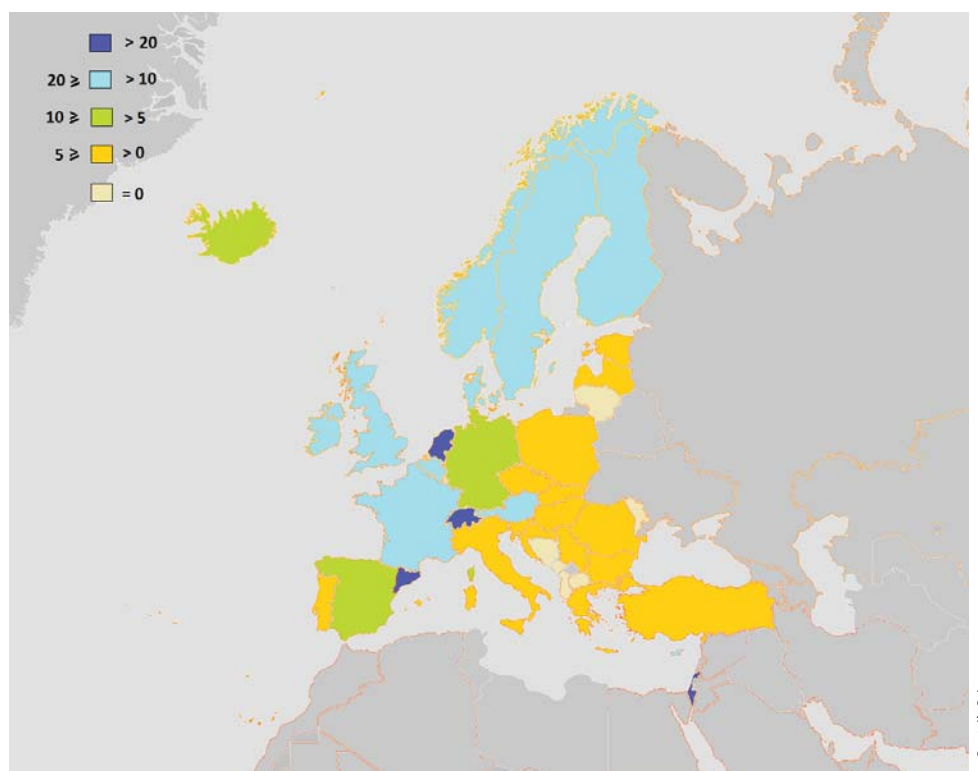
Catalonia has been able to consolidate a research system that, despite suffering an unprecedented financial crisis, year after year achieves very relevant levels of scientific production. The last three years have been complicated by problems that only recently have finally been overcome, thanks to the efforts of the entire system. The important work carried out in universities, hospitals and research centers has yielded results with at least three consequences: first, the Catalan scientific system has been consolidated and strengthened; second, brilliant results have been obtained in many different scientific areas, and, finally, they have contributed high added value to the Catalan economy.

But what should be expected in the future? Although we hope to achieve budgetary stability, the economic prosperity experienced before the crisis has yet to be restored. The Catalan Government (*Generalitat de Catalunya*) must grapple with a situation in which further budget adjustments are not possible and that presumes only limited economic recovery closely linked to the income tax.

Among Catalan scientific institutions, those included in the CERCA (Research Centers of Catalonia) Institute deserve special mention (Fig. 1). The Government has tried to protect CERCA from the vulnerabilities of the public sector. From the ancillary budget law of 2011 to later minor regulations, a legal perimeter has been built that gradually allows preservation of CERCA's autonomy, necessary to maintain the good results of its member research centers. The aim of this Government is to ensure the protection of these centers. Thus, we are preparing a law of science for Catalonia. This will be a very necessary law, beyond its content. The law will be an extremely important event because it will confer stability to research, now and in the near future: having a law of science approved by a broad parliamentary consensus will provide many guarantees, regardless of who rules the Generalitat.

Furthermore, some progress has been made in increasing the critical mass of CERCA centers, through the SUMA Program, which is aimed at obtaining integrated structures of higher critical mass and scientific and economic competitive-

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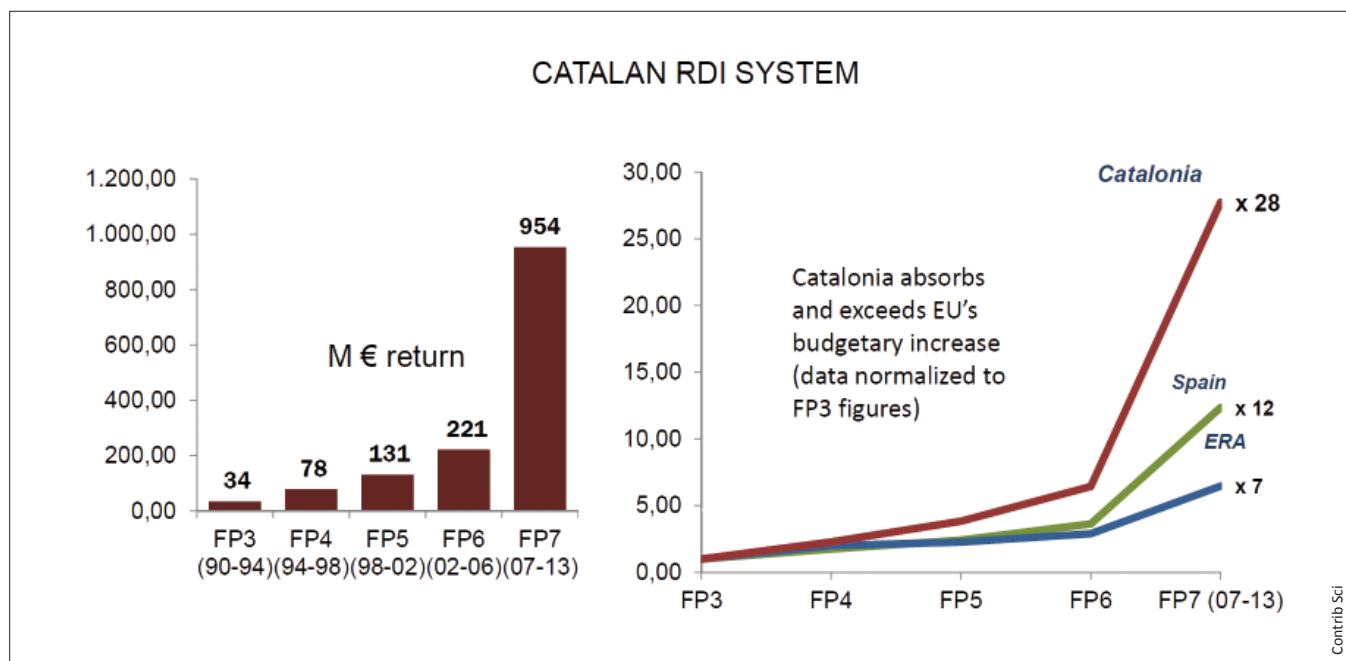
**Fig. 1.** With 22.8 grants per million inhabitant, Catalonia ranks 4th within the European Research Area, and second within the European Union.

ness. Despite its initial risks, the program has produced positive results. Increasing the critical mass is particularly necessary in the context of Horizon 2020, the eight phases of the European Framework Programs for Research and Technological Development. Competitive European funding programs are among the indicators that assign a high ranking to the Catalan research system.

Catalonia is the second EU country (just behind the Netherlands), based on per million inhabitants, in obtaining grants from the European Research Council, one of the most competitive programs. Considering the population of Catalonia, scientists working in the Catalan system obtain more grants than those in Germany and the UK. Catalonia, which has 0.1% of the world's population, is responsible for 1% of the world's scientific output. Specifically, Catalonia produces 32 publications per million inhabitants: just one publication less than Israel, but 10 more than Germany and 14 more than France. Thus, we can state that Catalonia has a good level of science that directly impacts the country's economic model, its economic growth and, therefore, its social progress towards a welfare society. However, while Catalan citizens are

aware of the country's excellence in tourism, gastronomy and sports, there is no general recognition of the country's excellence in science. This means that, in addition to moving forward in obtaining results, it is important to make Catalonians aware that the country has a very good reputation in the sciences.

Catalonia will only remain competitive by innovation: either doing what no one else does or doing it better or being the first to do it. The current challenge is to complete the massive transfer of the country's knowledge over the next ten years; by producing an impact on Catalan industry and by being able to create science-based companies and transform the country's own industries. The Catalan Government relies on different tools to promote such changes, from Industrial Doctorates to the joint financing of proofs of concept. Indeed, several conditions essential to making the sought after technological leap, such as tax incentives regarding public-private venture capital funds, do not depend on the Catalan Government. However, the challenge is not a new one: it is exactly what Catalonia faced during the 19th century, when it participated in the Industrial Revolution despite being a



**Fig. 2.** Catalan RDI system. Huge growth in fund attraction (M€): from FP3 to FP7 Catalonia has multiplied the fund attraction by 28.

country without natural resources. We are now facing the knowledge revolution (Fig. 2).

The goal is for Catalonia to become a Blue Country. What does that mean? In the classification that divides the countries of the world into three colors, red countries are those of Southern Europe, i.e., countries whose economies highly depend on domestic demand and are based on low value-added sectors. Yellow countries are emerging ones; despite their strong growth, the basis of their economies are the same as those of red ones: cheap labor and a strong dependence on the construction industry and low value-added sectors. Blue countries tend to have relatively small populations—usually no more than 10 million inhabitants—and they are profoundly democratic and cultured societies with a high level of trust between citizens, civil society and institutions. They also have strong higher education programs and research systems, which provide them with high added-value economies.

Let us dream. Catalonia has seven million people; it has

one of the oldest parliaments in Europe and, therefore, a deep democratic tradition. It also has a civil society rooted in the territory and with an important historical ability to build the country. In Catalonia, around 25% of the GDP comes from industry such that the country has one of the most powerful systems of knowledge in Southern Europe. Therefore, it has the potential to become one of the blue countries of the world and must take advantage of this great opportunity. When Catalonia joined the Industrial Revolution, its heroes were members of an entrepreneurial class and an enlightened Catalan bourgeoisie. These individuals were able to make the technological leap towards the cultural and political Catalan Renaissance. Now the world is facing a knowledge revolution, and the heroes of our country are scientists, that is, individuals able to make advances in knowledge and then transform them into value. With the support of the whole country, scientists can lead a second Catalan Renaissance in which our country becomes part of the Concert of Nations. 🟩

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**Resum.** Catalunya disposa d'un sistema de recerca amb resultats brillants que contribueix fortament a l'economia catalana. Tot i que representa el 0,1% de la població mundial, Catalunya és responsable de l'1% de la producció científica mundial. Davant la revolució del coneixement que estem vivint, el repte actual és culminar, en els propers deu anys, la transferència massiva d'aquest coneixement científic. Catalunya hauria d'esdevenir un País Blau: un país amb una societat profundament democràtica i culta, amb un alt nivell de confiança entre la ciutadania, la societat civil i les institucions. Hauria de tenir potents sistemes d'educació superior i de recerca que puguin proporcionar una economia amb un alt valor afegit per al país. Els científics, sent capaços d'avançar en el coneixement i transformar-lo en valor per a la societat, han de ser els herois del nostre temps. Ells són els que poden portar, definitivament, a esdevenir un País Blau.

**Paraules clau:** política científica · revolució del coneixement · ciència catalana

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