



RESEARCH CENTRES IN CATALONIA

CERCA Centres: The awakening of Catalan Research

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Summary. The 42 CERCA centres existing today come from a historical origin plus a new wave of creation of new R&D centres starting approximately in 2000. They all have their own legal status under the umbrella of the CERCA Institution (I-CERCA). I-CERCA plays a control and coordinating role including evaluation, selection of directors, merging CERCA centres, national and international promotion, technology transfer benchmarking, etc. CERCA centres are built on a basis of institutional collaboration with universities and hospitals (who fund them in kind), and promoted by the Government of Catalonia (who funds them in cash with 100 million euros annually that represent 25% of their global income). The outputs measured by ERCs granted, coordination of H2020 projects, HRS4R awards, etc. are impressive. The comparison of their scientific production (and impact) in 2012–2014 with CNRS, Max Planck Institutes and CSIC is surprising! CERCA's contribution to the expanding Catalan Science is crystal-clear. [Contrib Sci 12(1):1-3 (2016)]

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Since 30 years ago several research centres were created in Catalonia, mainly around the area of Barcelona, with a legal status of consortium (in the first two decades approx.) and foundation (in the last dozen of years). Among the initial centres there were the Institute of Agrifood Research and Technology (IRTA), the Centre for Demographic Studies (CED), the International Center for Numerical Methods in Engineering (CIMNE), the Institute for High Energy Physics (IFAE), the Centre for Mathematical Research (CRM) and others. A common characteristic of these centres is that they all were promoted by the Catalan Government (Generalitat de Catalunya) although involving other stakeholders such as universi-

ties or the Institute for Catalan Studies (Institut d'Estudis Catalans).

The second period of creation of R&D centres started approx. in the year 2000 in a new conception of what R&D centres should be. The idea of CERCA is attributed to Prof. Andreu Mas-Colell who foresaw how to overcome the restrictions for research performance in the Catalan universities at that time through the creation of a ring of R&D centres (CERCA) with outstanding capacities for excellent research, built on critical mass and successful researchers as leaders for these "new institutions". At this time appeared new centres such as Centre for Genomic Regulation (CRG), Institute for

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Research in Biomedicine (IRB), Institute of Photonic Sciences (ICFO), Institute of Chemical Research of Catalonia (ICIQ), and others.

In 2016, the 42 CERCA centres are:

Agrotecnio. Centre for Research in Agrotechnology
CED. Centre for Demographic Studies
CIMNE. International Centre for Numerical Methods in Engineering
CMR[B]. Centre of Regenerative Medicine in Barcelona
CRAG. Centre for Research in Agricultural Genomics
CREAF. Centre for Ecological Research and Forestry Applications
CREI. Centre for Research in International Economics
CRG. Centre for Genomic Regulation
CRM. Centre for Mathematical Research
CTFC. Forest Sciences Centre of Catalonia
CTTC. Telecommunications Technological Centre of Catalonia
CVC. Computer Vision Centre
i2CAT. Internet and Digital Innovation in Catalonia
IBEC. Institute for Bioengineering of Catalonia
IC3. Catalan Climate Sciences Institute
ICAC. Catalan Institute of Classical Archaeology
ICCC. Catalan Institute of Cardiovascular Sciences
ICFO. Institute of Photonic Sciences
ICIQ. Institute of Chemical Research of Catalonia
ICN2. Catalan Institute of Nanoscience and Nanotechnology
ICP. Catalan Institute of Palaeontology Miquel Crusafont
ICRA. Catalan Institute for Water Research
ICRPC. Catalan Institute for Cultural Heritage Research
IDIBAPS. August Pi i Sunyer Biomedical Research Institute
IDIBELL. Bellvitge Biomedical Research Institute
IDIBGI. Girona Biomedical Research Institute
IEEC. Institute of Space Studies of Catalonia
IFAE. Institute for High Energy Physics
IGTP. Health Sciences Research Institute of the Germans Trias i Pujol Foundation
IISPV. Pere Virgili Health Research Institute
IJC. Josep Carreras Leukemia Research Institute
IMIM. Hospital del Mar Medical Research Institute
IPHES. Catalan Institute for Human Palaeoecology and Social Evolution

IR-Sant Pau. Sant Pau Institute of Biomedical Research

IRB Barcelona. Institute for Research in Biomedicine

IRB Lleida. Biomedical Research Institute of Lleida

IREC. Catalonia Institute for Energy Research

IrsiCaixa. Institute for AIDS Research

IRTA. Institute of Agrifood Research and Technology

IS GLOBAL. Barcelona Centre for International Health Research

VHIO. Vall d'Hebron Institute of Oncology

VHIR. Vall d'Hebron Research Institute

CERCA initially was a programme of the Catalan Government mainly to fund R&D centres. However when the CERCA Institution (I-CERCA) started its endeavour in 2010 as the Agency devoted to support CERCA centres, some other strategic issues arose. I-CERCA monitored and externally evaluated the activity of the CERCA centres from a holistic point of view, analysing the scientific performance, the knowledge and technology transfer, the recruitment of researchers, the administrative management and the scientific dissemination and impact. The first international evaluation exercise was held in 2012–2013. Now, in 2016–2018 CERCA centres are being re-evaluated again. Now the assessment is expected to classify CERCA centres in four categories of performance. Low performance will be associated to executive consequences like thinking over the continuity of the centre.

In addition I-CERCA has worked to achieve a certain level of recognition for CERCA at national and international level, and has promoted technology transfer activities through the CERCA KTT Commission (Knowledge and Technology Transfer Commission). This Agency has also managed the SUMA programme, supported by the Catalan Government, oriented to reduce the number of centres through merging them in a bottom-up exercise complemented by economic incentives. CERCA started in 2010 with 47 centres and now only 42 are still active. It's important to note that almost no scientific capacity has been lost. Merges include all research groups in the resulting centre. Like this, some emblematic institutes have disappeared (IG, CREAL, CRESA, IMPPC, CRESIB, ...) being merged with other ones, and creating ambitious scientific platforms to fight for relevant EU projects. Finally, I-CERCA has been responsible, in connection with the Scientific Advisory Board of each CERCA centre, for the selection of Directors at the CERCA centres. Fresh air, avoiding in-breeding in open, international calls has been the result. (More info at www.cerca.cat).

Nowadays, the aggregated annual budget of all CERCA

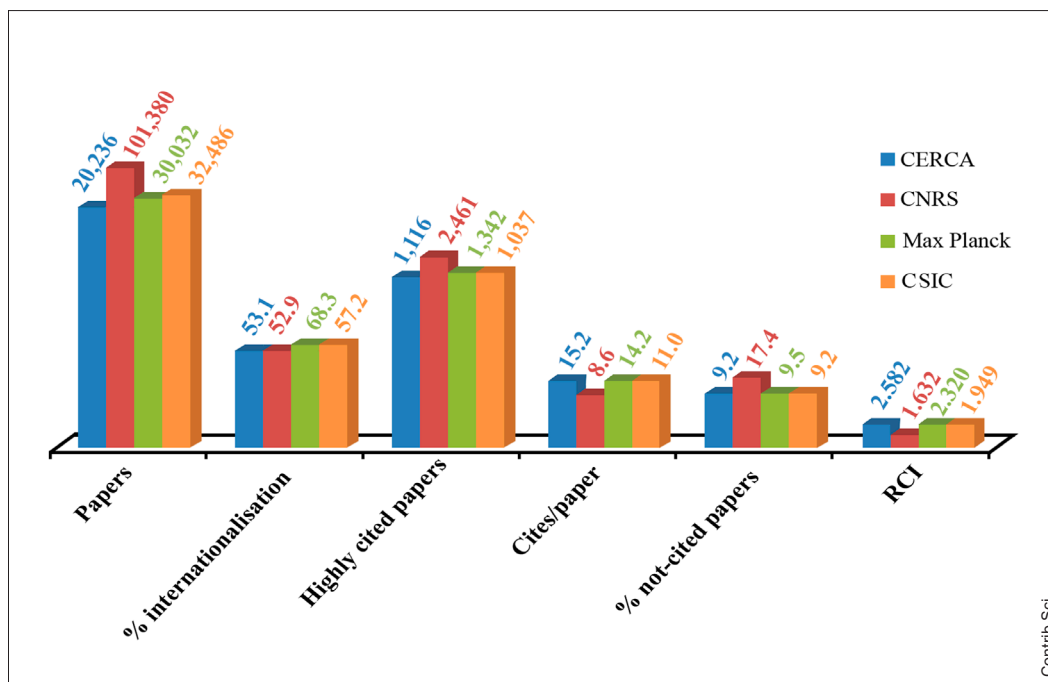


Fig. 1. Comparative scientific production and impact, 2012–2014. Data Source: *Web of Science-Thomson Reuters*, calculated by BAC [<http://bac.fundaciorecerca.cat/>].

centres is about 400 million euros. The contribution of the Catalan Government to the budget is 25%. The rest of income accounts from competitive projects (mainly EU), private contracts, philanthropy, etc. The CERCA centres have expanded their activity from 2011 to 2014, when an increase in 30 million euros has been reported in competitive projects. Another very important income in kind at the CERCA centres comes from universities, hospitals and other institutions. This part includes the pay-role of many researchers who are at the same time lecturers at university or doctors in hospitals. These salaries are mainly paid by the origin institution although they undertake research at CERCA centres, usually located in university campuses or near a hospital.

The scientific performance is heterogeneous but outstanding. In the period 2012–2014 all CERCA centres have published over 20,000 papers in WoS journals, and 1116 papers have evolved as highly cited. The ratio of foreign authors in this scientific production is 53%. And only 9.2% of the articles have not been cited yet. The Relative Citation Impact (RCI) related to citation obtained comparing to other papers at the same journal and year is 2.5, therefore two and half times over the average citation. Comparing CERCA to CNRS, Max Planck and CSIC for the same time-window results are

surprising for such a young system of R&D centres (Fig. 1).

As a measure of excellence in European top-research, the CERCA centres have been awarded with 120 ERC grants in the different calls (Starting, Consolidator, Advanced, Prove of Concept and Synergy). 65% centres are coordinating H2020 projects. In addition 26 CERCA centres have obtained the recognition HRS4R from EU-Euraxess.

The scientific policy regarding CERCA centres in Catalonia has been developed under a framework of political consensus and institutional collaboration especially with universities and hospitals, searching win-win synergies for the country. The generosity of stakeholders and the rigorous task of the managers at different levels have perfectly complemented the key role of researchers. One step forward has been done.

Still some challenges in the way to success, but in the meanwhile...Catalonia as a whole has doubled in the last 15 years its scientific production share to the world. And in terms of Highly Cited Papers (HCPs) the increase in the world share has been 5-fold approx. This geographic scientific miracle has been catalysed by the CERCA centres. Now Catalan Research is in the map of EU. ■

Competing interests. None declared.