Catlabs as a Collaboratory: a prototype of a universal innovation system in the digital era

Working Paper in progress

Artur Serra
Fundació i2cat

Tatiana Fernández
Direcció General de Promoció Econòmica, Competència i Regulació

CAT LABS

1. European context

1. 1. The current situation

The European Union sees itself as the world's leading producer of scientific knowledge, ahead of the United States. However, Europe too rarely succeeds in turning research into innovation, in getting research results to market (the so called European Paradox). But this is just a symptom of a deeper crisis: The European Union still doesn't have the kind of innovation system that fit the current digital technological cycle.

The current European innovation system needs an urgent update. The two main changes could be:

a. First, to unify research and innovation in a single approach, generating more disruptive research and innovation disciplines like computer science or synthetic biology. In that sense, the EU could develop its own "smart specialization" by prioritizing fields like digital social technologies, that combining emerging digital technologies (5G, IoT, AI…) with social sciences, (economy, politics, sociology,…) generate new social "high techs"

b. Second, the European Union should be the first continent to open its research and innovation ("open innovation and open science") to every actor in the community, using a fourth helix approach, developing the first prototypes of universal innovation systems of the digital era. Europe is still trying to conserve the innovation systems of the previous technological cycle. It is time to generate the innovation system of the "knowledge society". This is the only way to conserve the previous one.

1.2. The vision: The Collaboratories, knowledge societies as universal innovation ecosystems

Internet is becoming the new infrastructure of the information society. Internet started from the research and innovation community in one country. Now it embraces half of the world population, but in next decades it could become a digital network with universal access.

It is time to envision the new structure of the knowledge society. Our hypothesis is that the Collaboratory could be this new structure: a global mesh of open innovation, open science communities working in real/virtual spaces, sharing not only information and

communication but innovation and research in the most diverse fields for the benefit of each other community.

This collaboratory would be the adequate structure for the new paradigm of Open Innovation, Open Research and Open to the World proposed by the European Commission in 2016, characterised by:

- An open science system:

  · Excellent science capacities

  · Scientific work that corresponds to the needs of the users and society

  · Findable, accessible, interpretable and re-usable (FAIR) knowledge

- An open innovation ecosystem:

  · Which helps to connect and exploit the results of open science

  · Which facilitates the fast translation of discoveries into societal use and economic value

- An open to the world innovation and science ecosystem:

  · International collaboration ensures access to a broader set of competences, resources and skills wherever they are located,

  · International collaboration fosters better scientific quality and research results.

The collaboratory would be the implementation of the Lab vision of the European Commission: a universal innovation and science virtual environment functioning as **a Lab,** in which businesses, academia, public administration and citizens and civil society work together to design, develop and implement innovative and adequate solutions to complex societal challenges.

Europe, with a long tradition in building universal systems (such as the universal healthcare system), could be pioneer in this new structures of innovation.

CAT▥
LABS

2. Vision and strategic objectives of Catalonia: The Catlabs program
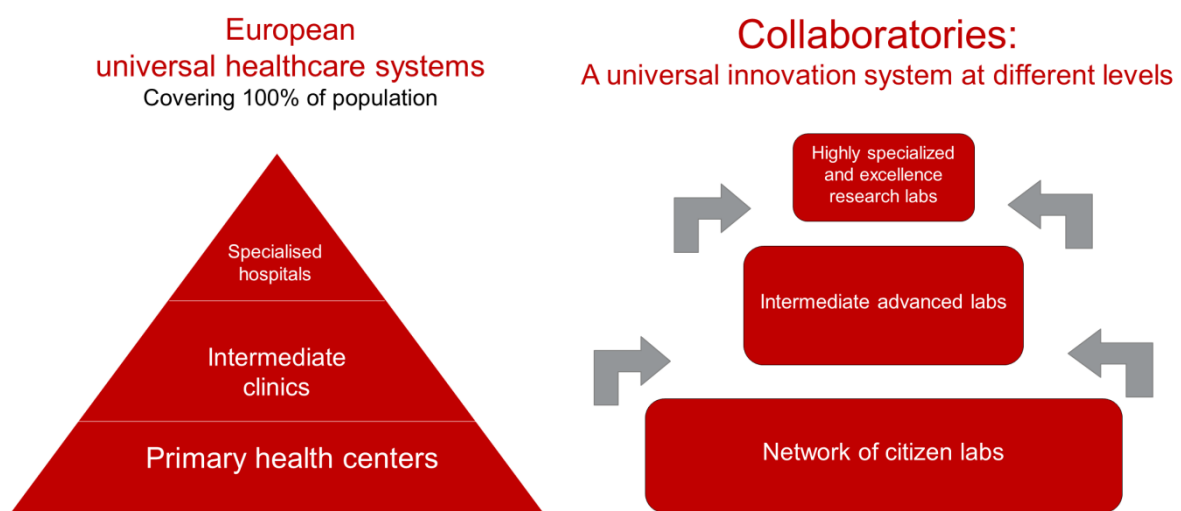
2.1. The Catlabs as a collaboratory: the concept

Catalonia through Catlabs wants to build a first prototype of a universal innovation regional system in the digital era.

Catlabs is a research and innovation program funded by the Regional Innovation Strategy, RIS3CAT. As a research program, its main goal is to explore how the Collaboratory hypothesis can be tested. The way to do it is by building a network open to all citizens with a structure of three levels:

- a selected network of highly specialized and excellence research labs open to the world.

- a network of intermediate advanced labs

- a distributed wide network of citizen labs

This structure would be similar to the structure of European universal healthcare systems, covering all the population.

Source: Artur Serra (2017): The World of Citizens Labs.
http://catalunya2020.gencat.cat/web/.content/00_catalunya2020/Documents/noticies/fitxers/20170525-EAPC/20170525-EAPC-ArturSerra.pdf

The collaboratory should focus on societal complex challenges that require collaborative innovative solutions from quadruple helix (4H) stakeholders. The complex challenges need systemic innovation.

2.2. Strengths/opportunities

Through the Catlabs program, adopted by the Catalan Government in November 2016, the Research and Innovation Strategy for the Smart Specialisation of Catalonia (RIS3CAT) has adopted the Open Innovation, Open Science and Open to the World paradigm proposed by the European Commission in 2016.

More specifically, the CatLabs program, aims to establish and consolidate a Catalan network for digital, social and collaborative innovation:

- Increasing the number of actors who play a role in innovation and users of social digital and collaborative innovation spaces.

- Increasing the involvement of universities, schools, technology and research centres and other stakeholders in the field of innovation with regard to the challenges to the territory and citizens. This will translate into an increase in innovations that respond to the challenges facing Catalan society.

- Increasing the number of people trained in digital technologies who take part in innovation projects, in this way enhancing their employability.

- Increasing the internationalisation of member organisations of the network and establishing Catalonia as a benchmark in social digital and collaborative innovation in Europe.

Catalonia has made an extraordinary effort in the last 20 years to develop an excellent network of research centres (CERCA) and innovation centres (TECNIO) and the main challenge identified in the RIS3CAT is the same of the European Union: transforming knowledge and technology into economic and social value.

In this context, the Catalan Government wants to use the RIS framework to open the science and innovation system to the citizens. This is the main goal of the Catlabs program: to favour that entities like fablabs, livinglabs and other collaborative articulated in international networks, develop a quadruple helix model of innovation by connecting the high level research and innovation (under Horizon 2020) with more local social, digital and collaborative innovation initiatives (under the RIS3CAT).

Using challenge-driven approaches, Catlabs wants to become with the 2020 perspective a first protype of the regional collaboratory that creates value for all participants.

2.3. Obstacles/challenges

- A major obstacle is the mindset framework of many experts in regional innovation systems, still anchored in the OECD definition, which is not fit for the digital era.

- Difficulties to visualise the opportunities of the project by all relevant stakeholders.

- Low knowledge absorption capacity of public administration, civil society and companies, which hinders the collaboration of 4H stakeholders in the innovation process to develop knowledge-based innovative solutions to societal challenges.

- Lack of mutual trust between stakeholders, which makes 4H collaboration and knowledge exchange very difficult.

- Lack of physical spaces or virtual platforms/structures, where 4H stakeholders exchange ideas and exploit knowledge to coproduce new solutions to societal challenges (local and global).

- Lack of common procedures, tools and methodologies to articulate 4H social innovation processes.

- Lack of monitoring and evaluation methodologies and tools adequate for collaborative social innovation processes. They should be oriented:

  · To promote collaborative learning processes (monitoring for learning) increasing knowledge and innovations absorption capacity of society (4H stakeholders).

  · To showcase best practices through the "generalisation" of prototypes (making global local solutions/innovations).

  · To produce knowledge and provide information for better evidence-based decisions for getting best value (social and economic) for money.

- Lack of financial instruments and funds (public and private) to support open innovation focused on societal challenges, because of the difficulties to measure the impact and the benefits of social innovation.

3. A roadmap to advance towards a universal innovation system in Catalonia: the Catlabs collaboratory

The roadmap to build the universal innovation system of the digital era has to be discovered, so are the challenges and the opportunities associated with it. In this section we propose a roadmap for the Catlabs collaboratory.

3.1. The research program and its hypotheses

Catlabs is not only an innovation project. It is at the same time a research program, with theoretical hypothesis that should be elaborated and tested.
The main hypotheses on the basis of the Catalan roadmap are following:

a. Catalonia can design and build a universal innovation ecosystem by combining its current research and innovation institutions with a new generation of open innovation and research labs (fablabs, living labs, citilabs, etc.). The first assumption is to recognize that every citizen can participate and become member of the Catalan innovation system.

b. The Catalan strength is in its people. A citizen-driven innovation model needs to combine the bottom-up and the top-down approaches. An innovation partnership between regional and local administrations is a necessary precondition.

c. Catalonia can be an example of the complementarities and synergies among the EU Structural and Investment Funds, Horizon 2020 funds and other sources of financing (like crowdfunding) to implement RIS3 in Europe.

3.2. The process of building the Catlabs collaboratory

The collaboratory will be constructed on the basis of 4H collaborative networks working on new solutions to societal challenges under a common strategy providing 4H stakeholders common objectives, common guidelines and methodologies, training, common digital infrastructure and incentives to collaborate (through the generation of demand of new collaborative solutions to complex societal challenges).

3.2.1. Phases

1. Identification of the obstacles/challenges to articulate the Catlabs collaboratory (2.3.)

2. Identification of possible solutions to overcome the obstacles / challenges (formulation of hypothesis under a theory of change):

3. Design and implementation of 4H innovation projects (prototypes) to validate the hypothesis and the theory of change and to provide new evidence.

4. Generation of new knowledge through the monitoring and evaluation of the prototypes under a common framework (from the particular evidence to the general knowledge).

5. Definition of the universal innovation system in the digital era (evidence-based)

3.2.2. Support mechanisms

- Codesign of a common framework and a common strategy with a governance.

- Construction of an open digital platform for the Catlabs collaboratory. Exploring diverse platforms of innovation.

- Creation of the Catlabs Research Think Tank (virtual) to produce new knowledge and a common theoretical framework for universal innovation systems in the digital era (organisation of an International Research camp the first semester 2018, to develop a common theoretical framework for Research in Europe on universal innovation systems in the digital era).

- Development of methodologies for open innovation structures and open innovation projects. (Innovation Camps, ULabs, etc.)

- Generation of demand from public sector for collaborative innovative solutions to complex societal challenges (through calls, competitions and other mechanisms).

- Training for 4H stakeholders (open innovation process, digital competences, etc.)

- Technical support for 4H open innovation processes.

- Development of monitoring and evaluation tools.

- Identification and exchange of best practices, generation of evidence-based new knowledge, discussion forums for learning (also at international level).