November 2023. Technological snapshot

Analysis of the deeptech startup ecosystem in Catalonia, 2023

ACCIÓ Catalonia Trade & Investment

Generalitat de Catalunya

Fem avui l'**empresa** del demà

ACCIÓ
Government of Catalonia

Carried out by
Strategy and Competitive Intelligence Unit of ACCIÓ

Barcelona, November 2023

Contents

Executive summary: deeptech in Catalonia (I)

Deeptech companies have a **solid technological and scientific base, they generate impact and they seek to make the world a better place.**

Characteristics of deeptech companies

- They have roots in science, technology and engineering.
- They provide transformative solutions for global challenges.
- They exploit new scientific and technological knowledge and they have knowledge protection mechanisms.
- They tend to result in physical products (rather than services) that change established paradigms and generate new business models.
- They have slow scalability and they need long-term funding.
- A large number of the founders emerge from the university and research systems.
- They need business talent and people from the STEM and R&D disciplines.

Technologies regarded as deeptech*

- Artificial intelligence
- Biotechnology
- DLT/blockchain
- Robotics
- Semiconductors
- Sustainable and frontier materials
- Batteries and clean energy
- Photonics
- Quantum
- Supercomputing

World market

Generative AI and technologies that have the purpose of combating climate change are acquiring a great deal of prominence.

86.2% of companies consider that new and frontier technologies will become the main transformational trend.

European market

19 billion dollars were invested in deeptech startups in Europe in 2022.

*For the purposes of this report

Executive summary: deeptech in Catalonia (II)

Catalonia has **320 deeptech startups**, **10% more than in 2022**, and they account for **15.8% of the Catalan entrepreneurial ecosystem**.

320 deeptech startups

This represents an increase of **10%** with respect to 2022.

They account for **15.8%** of the total number of startups in the Barcelona & Catalonia Startup Hub.

They bill **€161 M** (**+30%** with respect to 2022) and employ **2,340** workers (**+35%**).

The main technologies are biotechnology (**38.8%**), artificial intelligence (**25.0%**) and frontier materials (**10.6%**).

43% of deeptech startups are spin-offs.

46% of deeptech startups have a patent or a system to protect their knowledge.

Funding raised

2022 was the year with the largest volume of investment raised by Catalan deeptech startups (**€183 M**). They have raised **€106 M** until October 2023.

Barcelona is the **7th largest European hub** in terms of the volume of funding raised by deeptech startups in venture capital (2018-2023), with a total of **€480 M**.

78.4% of Catalan deeptech startups have obtained venture capital funding.

It's the European region that's attracted the second largest amount of funding (**€40 M**) for deeptech startups in the latest call of the EIC Accelerator in 2022.

152 deeptech startups in Catalonia have received Startup Capital support (**€12.4 M**).

Active public policies

National pacts:

- National Pact for Industry
- National Pact for the Knowledge Society

Investment funds:

- *Línia Startup Capital Coinversió*
- Startup Capital
- *Fons d'Inversió en Tecnologia Avançada*
- Barcelona Deep Tech Fund

Different ICF, Avançsa and AGAUR instruments

Ecosystem agents

44 Centers and institutions that generate deeptech spin-offs

12 Incubators and accelerators

37 Venture capital funds

10 Institutions

4 Clusters

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1. Definition of deeptech

Characteristics of deeptech companies

Deeptech companies are based on scientific knowledge and major technological advances. They include innovations on the frontiers of knowledge in basic disciplines such as biology, chemistry, physics, mathematics and engineering (STEM).

They develop pioneering knowledge and technology or provide a clearly identifiable and impact-generating improvement.

They seek to provide solutions for social problems and global challenges, with a particular focus on the sustainable development goals.

They have mechanisms to protect intellectual property, patents, etc.

They tend to be projects with a high technological and market risk, as a result of which they have significant financial needs before they reach the market.

The time to market, from their conception until their availability on the market, is usually longer than that of conventional companies.

Their founders have usually acquired their knowledge and training in the university system or they have emerged from the research system.

Deeptech companies tend to have a multi-disciplinary approach, with hybridization of technologies and knowledge.

The goods and services offered by many deeptech companies can be made tangible in some way or they can generate an impact on society.

Source: ACCIÓ, based on interviews with experts

The seven differences: deeptech vs. non-deeptech

	Deeptech		Non-deeptech
1	They're rooted in cutting-edge science, technology and engineering, and they combine advances in the physical, biological and digital spheres.		They have roots in technology or mature innovations that already exist in the market.
2	They have the potential to offer transformative solutions to global challenges and they help achieve the UN SDGs.		They offer solutions with a limited degree of impact on the industry or the markets that they target.
3	They tend to have their own patents or brands, and a multi-disciplinary approach, with hybridization of technologies and knowledge.		They rarely have patents or trademarks, and the approach tends to be uni-disciplinary, without any hybridization of technologies.
4	Their products, which tend to be physical ones rather than services, change established paradigms and generate new business models.		Their products, which tend to be digital services rather than physical products, offer improvements to the established paradigm.
5	They display slow scalability, a high time to market and a need for long-term funding that tends to entail sunk costs.		The scalability and the time to market tend to be fast, and they need funding early in the life of the business.
6	The founders emerge from the university or research system and apply the knowledge in their fields of expertise within the company.		Their founders can come from anywhere, regardless of whether or not they've gone through the university and/or research system.
7	They need talent with a high degree of business and STEM knowledge, as well as capabilities associated with R&D principles.		They need workers with basic knowledge of STEM disciplines.

Examples of deeptech: laser technology or quantum computer

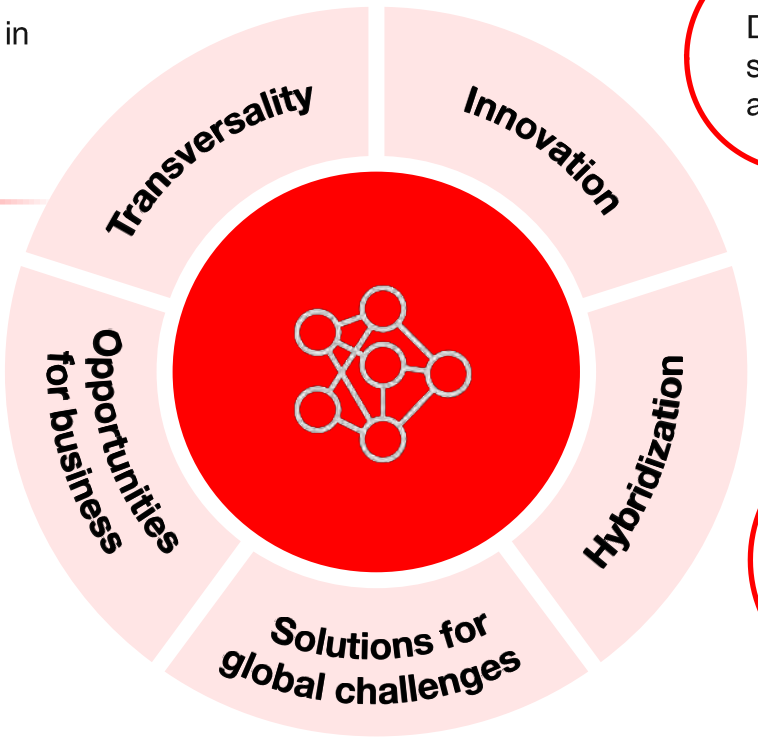
Examples of non-deeptech: development of apps or marketplaces

Source: ACCIÓ

Importance of deeptech

Deeptech companies can have an impact in many areas, such as health and life sciences, food, energy, materials and production processes.

Deeptechs stem from research and they're a source of innovation for other emerging applications.



New business models based on the applications of pioneering technical and emerging scientific solutions may appear.

The challenges are becoming increasingly complex and the solutions cannot be addressed via a single field of knowledge, which entails a hybridization of technologies and the concurrence of knowledge to identify innovative and sustainable solutions.

Deeptechs have a clear focus on providing solutions for global challenges such as climate change, health, resource scarcity, demographic changes, etc.

2. Deeptech technologies

10 deeptech technologies

It's difficult to make a selection of technologies, as deeptechs are characterized by their **approach** and **strategy**. For this reason, any technology within a given context may be regarded as deeptech.

In addition, the emergence of emerging technologies and hybridizations of knowledge are giving rise to a wide range of new opportunities.

However, the technologies that have been considered to be deeptech for the purposes of this report are as follows:

- Artificial intelligence
- Biotechnology
- DLT/Blockchain
- Robotics
- Semiconductors
- Sustainable and frontier materials
- Batteries and clean energy
- Photonics
- Quantum
- Supercomputing

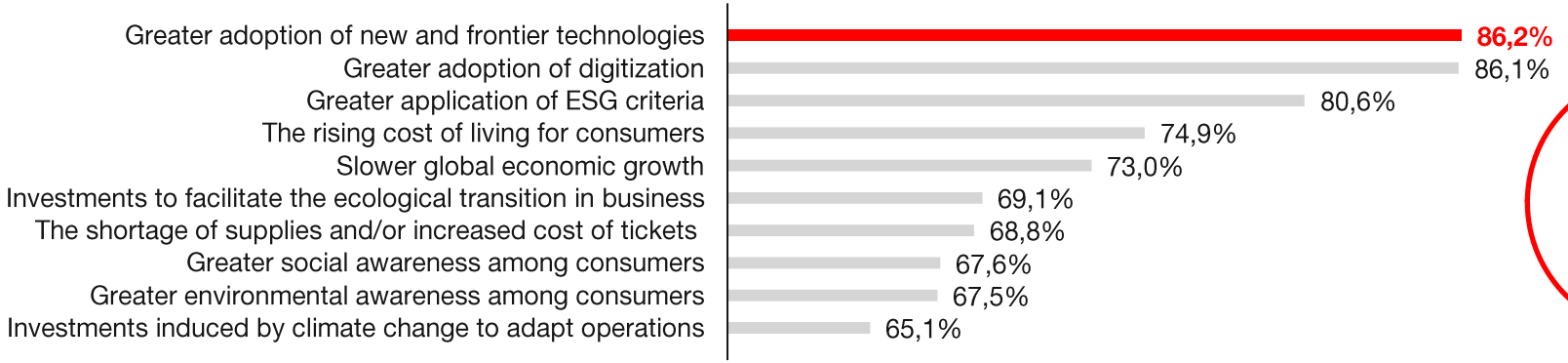
Note: the startup universe has been analyzed for the purposes of this report

3. Deeptech around the world

The growing importance of deeptechs around the world

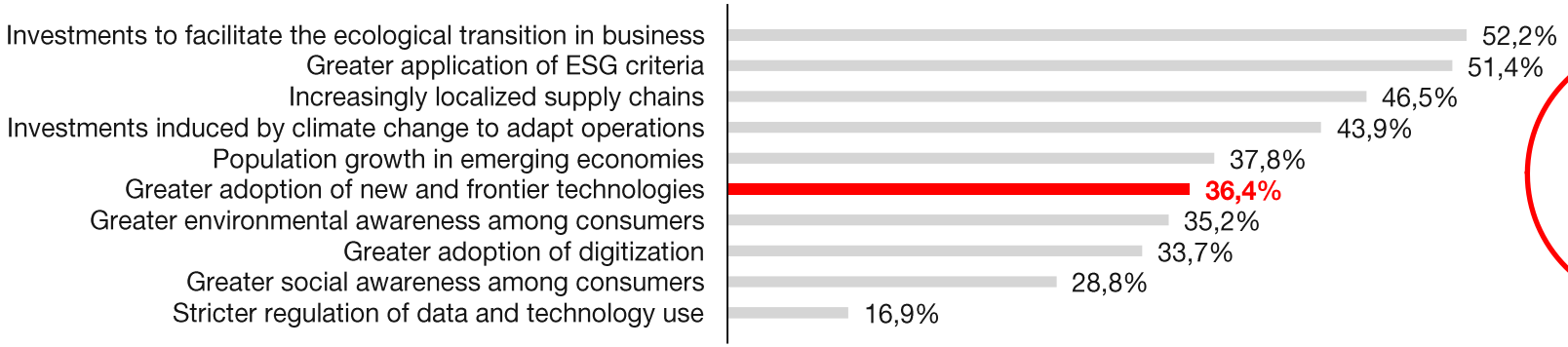
According to the World Economic Forum, new and frontier technologies are becoming increasingly important in the decision-making of organizations

Trends that will drive the transformation of organizations



86.2% of the organizations surveyed consider that new and frontier technologies will become the main transformational trend

Expected impact of trends on job creation in the 2023-2027 period



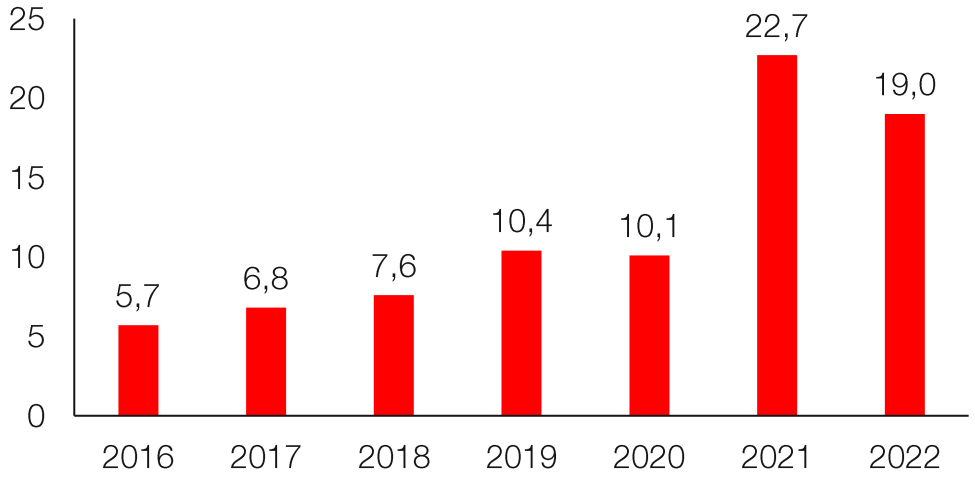
36.4% of the organizations surveyed predict that new and frontier technologies will have an impact on job creation in the mid term

Source: World Economic Forum (2023): *Future of Jobs Report*

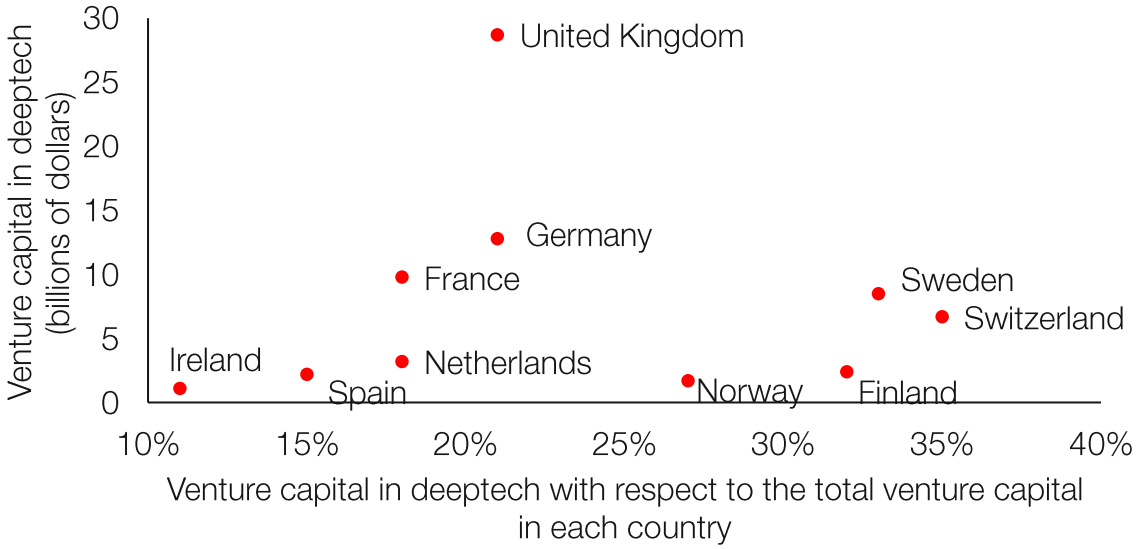
Venture capital in deeptech in Europe

19 billion dollars were invested in deeptech startups in Europe in 2022. Despite the 16% year-on-year decline, the drop is lower than the overall decline in startup venture capital (-18%).

Venture capital in deeptech startups in Europe (billions of dollars). **2016-2022**



Venture capital in deeptech and % with respect to the total, by European countries (the top 10). **2016-2022**



Startup creation and funding fell in 2022 as a result of the macroeconomic situation. Despite the above, the commitment to deeptech is rising: the emergence of generative AI is transforming the innovation ecosystem, while technologies aimed at combating climate change are gaining ground.

Source: Dealroom (2023): *The European Deep Tech Report*

European policies: the European Innovation Council

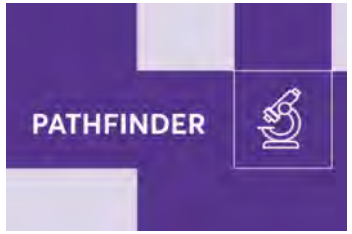
The EIC is Europe's flagship innovation program for **identifying, developing and expanding disruptive innovations and technologies**.

European Innovation Council

The European Innovation Council (EIC) came into being within the framework of the EU's Horizon Europe program. It has a budget totaling 10,000 million euros to support disruptive innovations throughout their life cycle, from the early-stage research to the proof of concept, technology transfer and funding and the scaling up of emerging companies and SMEs.

Featured programs:

EIC Pathfinder



Support for the exploration of cutting-edge and high-risk/high-reward technologies. The "Pathfinder" seeks to go beyond what we already know and encourages visionary thinking liable to open up new and powerful technologies.

EIC Transition

It funds innovation activities that reach beyond experimental testing to support technology maturation and validation and the development of a business model for its marketing.

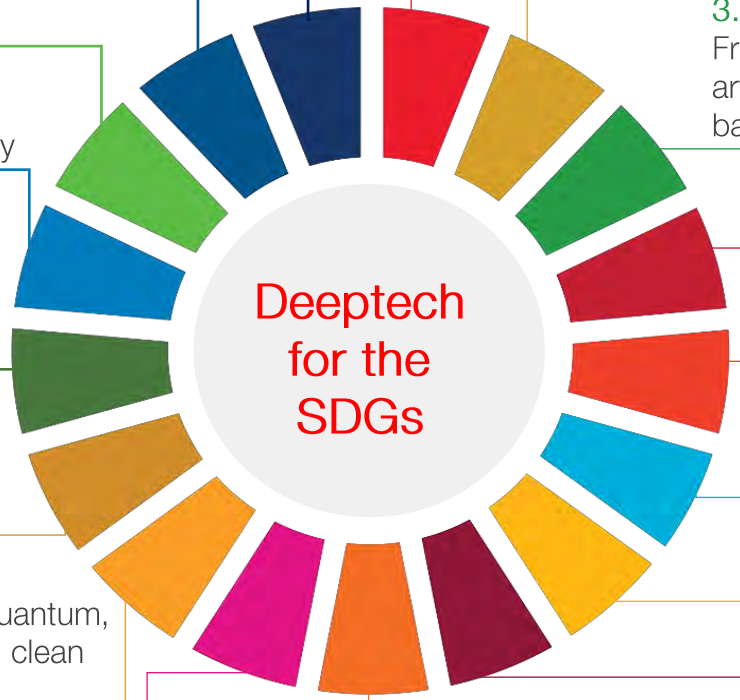
EIC Accelerator

It provides funding for startups and SMEs with an innovative product, service or business model that changes the existing paradigm to create new markets or disrupt existing ones.

Source: European Innovation Council

4. Deeptech and the SDGs

Contribution of deeptech technologies to the SDGs



16. Peace, justice and strong institutions

17. Partnership for the goals
Artificial Intelligence, DLT

15. Terrestrial life
Frontier and sustainable materials, artificial intelligence, DLT, biotechnology

14. Marine life
Artificial intelligence, DLT, biotechnology

13. Climate action
Frontier and sustainable materials, robotics, artificial intelligence, DLT, photonics, quantum, biotechnology, batteries and clean energy

12. Responsible consumption and production
Frontier and sustainable materials, semiconductors, robotics, artificial intelligence, DLT, photonics, quantum, batteries and clean energy

11. Sustainable cities and communities
Frontier and sustainable materials, semiconductors, quantum, robotics, artificial intelligence, photonics, batteries and clean energy

10. Reduction of inequalities
Artificial intelligence, robotics

9. Industry, innovation, and infrastructures
Frontier and sustainable materials, robotics, semiconductors, artificial intelligence, DLT, photonics, quantum, biotechnology, batteries and clean energy

8. Decent work and economic growth
Frontier and sustainable materials, robotics, semiconductors, artificial intelligence, DLT, photonics, biotechnology, batteries and clean energy

7. Clean and affordable energy
Frontier materials, robotics, semiconductors, artificial intelligence, DLT, photonics, quantum, biotech, batteries and clean energy

6. Clean water and sanitation
Frontier and sustainable materials, artificial intelligence, robotics, DLT, photonics, biotechnology

5. Gender equality
Artificial Intelligence, DLT

4. Quality education
Robotics, artificial intelligence, DLT, quantum

3. Health and wellness
Frontier and sustainable materials, robotics, semiconductors, artificial intelligence, photonics, supercomputing, biotechnology, batteries and clean energy, quantum

2. Zero hunger
Frontier and sustainable materials, artificial intelligence, DLT, robotics, biotechnology

1. End of poverty
Frontier and sustainable materials, artificial intelligence, DLT

Source: the authors

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5. Deeptech in Catalonia

Mapping the deeptech startup ecosystem in Catalonia

320 deeptech startups

10%

€161 M in turnover

30%

15.8% of the total number of startups in the Barcelona & Catalonia Startup Hub

2,340 employees

35%

By technologies, deeptech startups in Catalonia are distributed as follows:

- **38.8%** in biotechnology
- **25.0%** in artificial intelligence
- **10.6%** in sustainable and frontier materials
- **7.8%** in robotics
- **5.0%** in photonics
- **4.4%** in batteries and clean energy
- **3.4%** in supercomputing
- **2.8%** in DLT/blockchain
- **1.3%** in semiconductors
- **0.9%** in quantum

Note: for the purposes of this mapping, the main technology used by each startup is selected. The Barcelona & Catalonia Startup Hub is made up of 2,022 startups (2022).

Source: ACCIÓ

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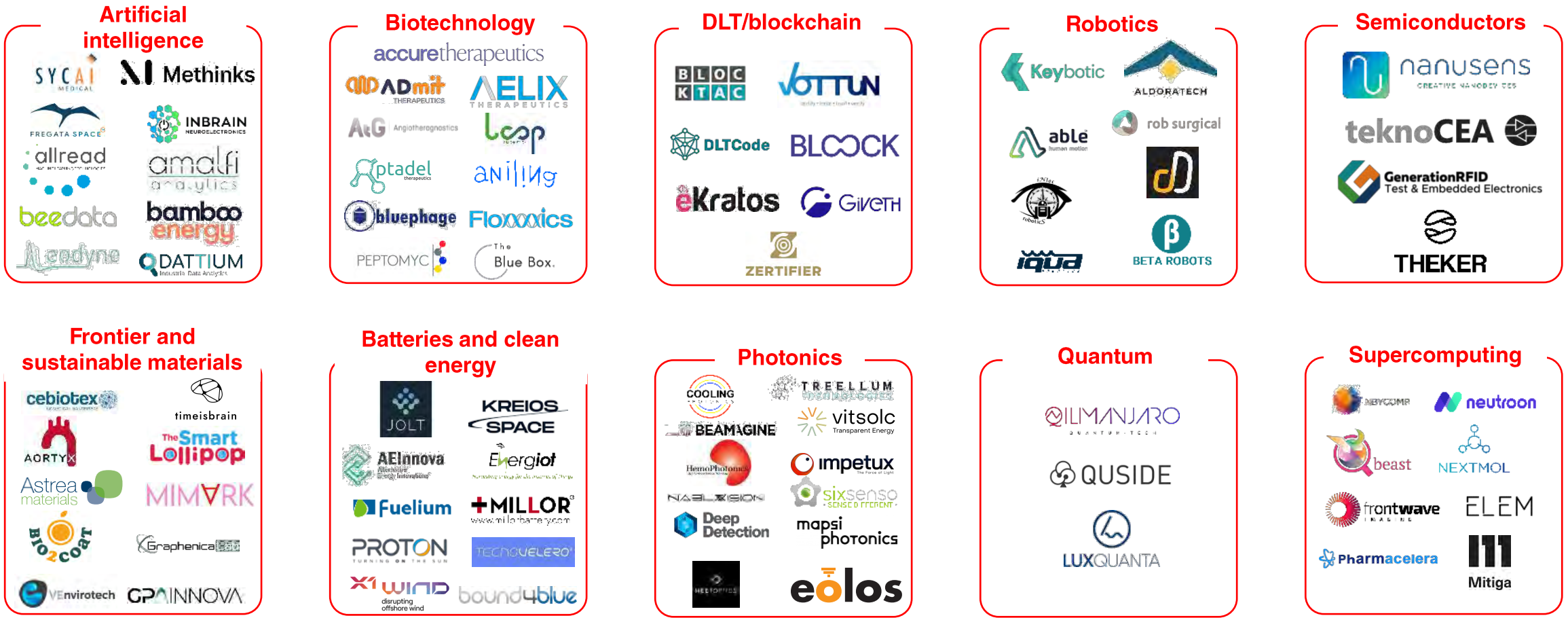
Mapping of deeptech startups in Catalonia



Note: partial illustrative image. For the purposes of this mapping, the main technology used by each startup is selected.

Agents of the deeptech ecosystem in Catalonia

Centers and institutions generating deeptech spin-offs

Incubators and accelerators

Venture capital funds

Institutions and public administration

Source: ACCIÓ

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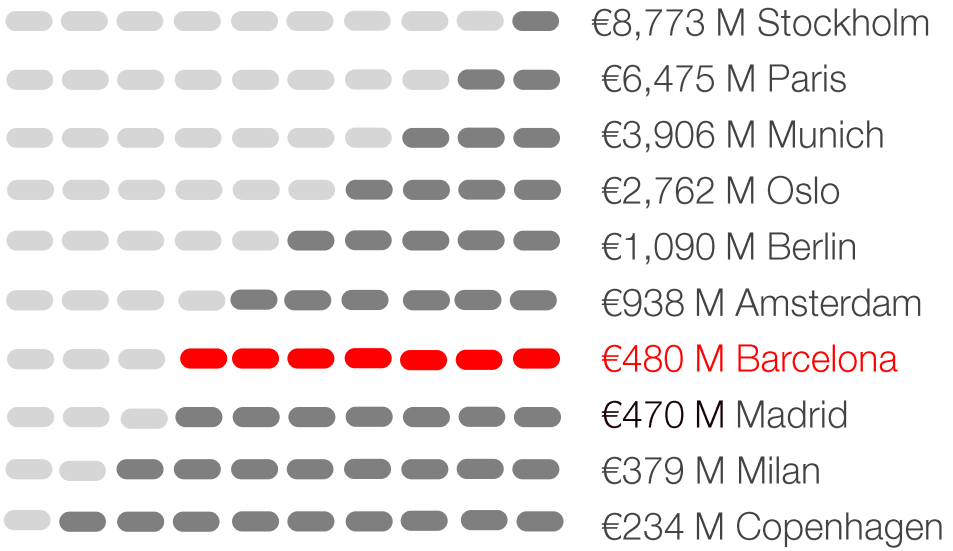
Funding raised by deeptech startups: ranking of European cities

Barcelona is the **7th largest European hub** in terms of volume of funding raised by venture capital deeptech startups in the 2018-2023 period.

Main European cities by volume of investments in deeptech startups. 2018-2023*



Note: consultation in Dealroom on 02/10/2023.
Provisional date: 2023

Source: Dealroom

Funding raised by deeptech startups: featured investments in 2022-2023

Featured deeptech investments in 2022-2023

10 main foreign investments in deeptech startups in Catalonia (2022-2023)

submer	PEPTOMYC	b4b	Heura	INBRAIN NEUROELECTRONICS
€31 M 2022	**€26.09 M** 2022	**€22.4 M** 2023	**€20 M** 2022	**€14.35 M** 2022

deepull	Mitiga	QUSIDE	FREEVERSE	amelia virtual care
€13 M 2022	**€13 M** 2023	**€10 M** 2023	**€10 M** 2022	**€7 M** 2023

Note: consultation in Dealroom (02/10/2023) taking Catalonia as its base or HQ.

Source: Dealroom (2023) and ACCIÓ CataloniaConnects

Catalonia, benchmark in the EIC Accelerator

Catalonia was the European region that attracted the second most funding for deeptech startups, with almost 40 million euros in the last call, in the 2022 EIC Accelerator.

- The 39.7 million euros of funding position Catalonia ahead of Lombardy and only behind Île-de-France.
- By cities, Barcelona leads the volume of funding raised with 33.9 million euros, ahead of Milan and Espoo (Finland).

The five startups selected were:

INBRAIN NEUROELECTRONICS — 17.5 million euros

ABCDx — 8.8 million euros

timeisbrain — 5.8 million euros

ELEM — 5.1 million euros

GATE2BRAIN Medicines beyond barriers — 2.5 million euros

More Catalan companies were also selected among the winners of the EIC Accelerator in 2022 and 2023:

ignion · Methinks · NBS NEWBORN.SOLUTIONS · SAALG GEOMECHANICS · MIMARK · NIMBLE Diagnostics · QUSIDE · PEPTOMYC

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Source: EIC Accelerator

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Ecosystem of consolidated deeptech companies in Catalonia

Although this study has analyzed the deeptech startup ecosystem in Catalonia, our territory is the cradle of science and technology, and one good example of the above is the fact that **Catalonia has well-established and renowned companies that also base their activity on deeptechs**, enabling this ecosystem to grow and evolve.

Artificial intelligence

AIA GRUPO, catchoom, AIS GROUP, IBM, minsait, BCG, ERNI

Biotechnology

AB-BIOTICS Part of KANEKA Corporation, Agilent Technologies, Bioiberica, ESTEVE más cerca, ferrer, GRIFOLS, REIG JOFRE, Roche

DLT/blockchain

Worldline, capside, Scytl, validatedID real identities for digital world, kualito, BLOCKTAC, JOTTUN

Robotics

CAT UAV, EBRE DRONE, KIVNON friendly innovation, KUKA, FANUC, ABB, YASKAWA, gmv, UNIVERSAL ROBOTS

Semiconductors and microelectronics

draco systems, EBV Elektronik, esperanto.ai, Fractus, IDEADED, imasenic, MPS, semidynamics, SEMIKRON innovation+service, WORLD SENSING

Frontier and sustainable materials

BASF, BAYER, MERCK, REPSOL, GPAINNOVA, 3M Science. Applied to Life.™, SANDVIK, NOVARTIS, AkzoNobel, ECOFOL TECH

Batteries and clean energy

WATHIUS, BOLD, wallbox, DENSO, PREMO, Gestamp, SMA SOLAR TECHNOLOGY, factorenergia, SCHNELLECKE LOGISTICS, solided

Photonics

ASE OPTICS EUROPE, COHERENT, HAMAMATSU PHOTON IS OUR BUSINESS, Macsa id, IRIS, INFAIMON, Ingenia, SENSOFAR, PRO-LITE TECHNOLOGY, monocrom, RADIANTIS, Ymaging, KEYSIGHT TECHNOLOGIES

Quantum

IBM, Microsoft

Supercomputing

IBM, intel.

Note: partial illustrative image

Active public policies from the promotion of deeptechs

National pacts

PACTE NACIONAL PER A LA INDÚSTRIA 2022-2025
PER UNA INDÚSTRIA GENERADORA DE VALOR COMPARTIT

National Pact for Industry (2022)

PACTE NACIONAL PER A LA SOCIETAT DEL CONEIXEMENT

National Pact for the Knowledge Society (2020)

Funding

NEW

Línia Startup Capital Coinversió

€2.5 M

Startup Capital

€2 M each year

Fons d'Inversió en Tecnologia Avançada (FITA)

€55 M endowment

\+ Instruments from ICF Institut Català de Finances, avançsa

ACCIÓ supports deeptechs

Between 2017-2023, 152 deeptech startups have received support from the Startup Capital grant, with a total amount of 12.4 million euros.

- ACCIÓ also provides support for companies that submit applications to the EIC Accelerator, one of the most competitive European programs rewarding excellence. Of the ten deeptech startups assessed, five have received funding:

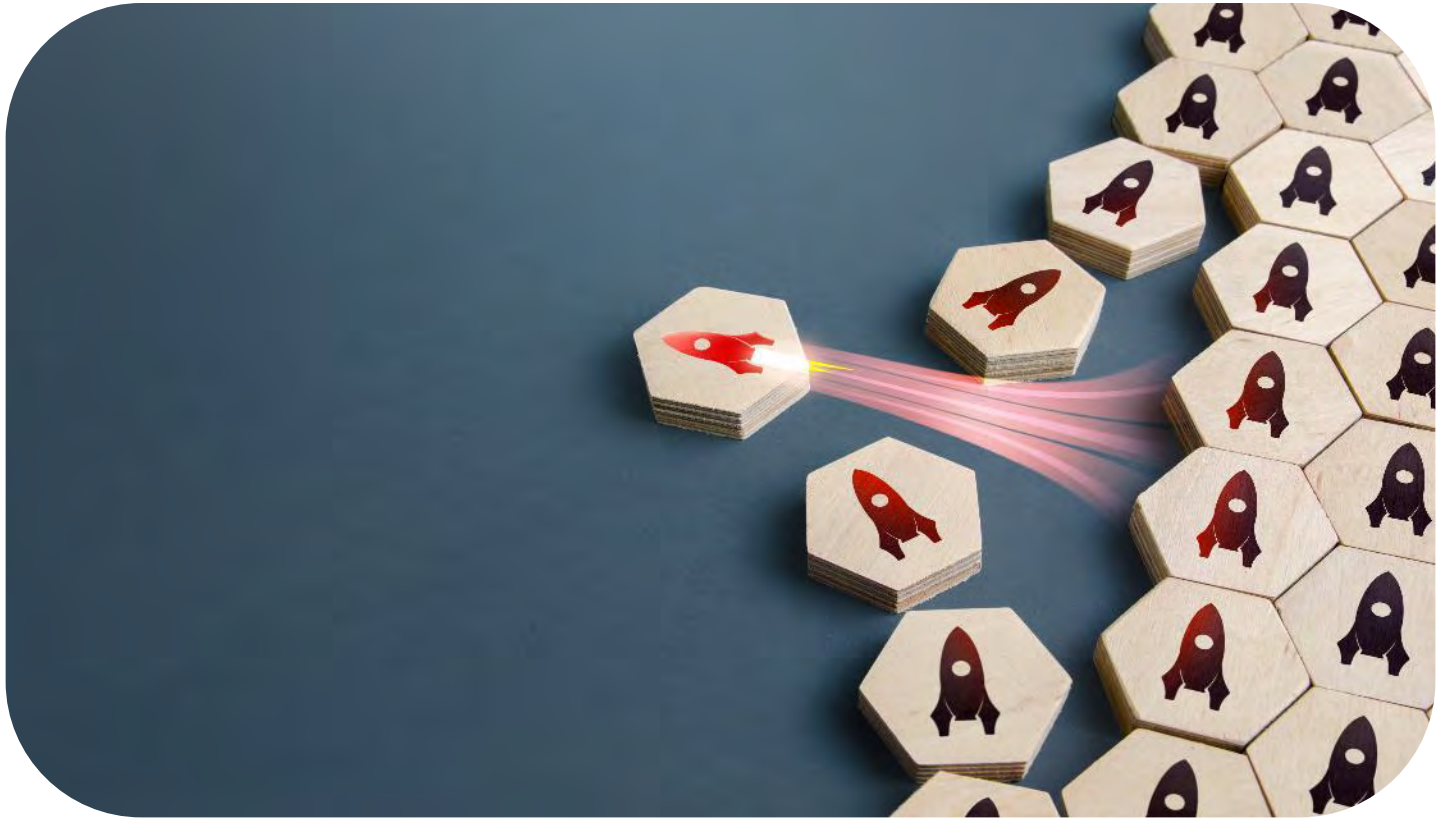
GATE2BRAIN
Medicines beyond barriers

Methinks

NBS
NEWBORN.SOLUTIONS

ROKA FURA DADA

X1 WIND
disrupting offshore wind



Source: ACCIÓ

6. Success stories in Catalonia

Success stories in Catalonia

MIMARK develops innovative diagnostic tests for unresolved clinical problems related to gynecological disorders.

METHINKS uses artificial intelligence to identify strokes and speed up diagnoses to prevent more serious consequences of the disease.

INBRAIN NEUROELECTRONICS is engaged in the development and marketing of neural interfaces based on graphene.

ABLE HUMAN MOTION has developed robotic exoskeletons to improve the quality of life of people with walking problems.

BEAMAGINE has developed and patented LIDAR technology that can obtain real-time 3D images in compact cameras.

AVANÇSA, attached to the Government of Catalonia, supports projects that apply deep technology, especially in the industrial field.

JOLT has developed catalytic solutions for the electrolysis of water to generate green hydrogen using renewable energies.

MITIGA has achieved major milestones in risk management by combining artificial intelligence and supercomputing.

ZERTIFIER uses blockchain technology to improve customer interaction, thus building a bridge between the physical and digital worlds.

UNISCOOL has developed a new liquid cooling system that reduces the energy consumption of data servers by up to 70%.

QUSIDE manufactures quantum components for connected devices to facilitate the next generation of supercomputing technologies.

GROW VP will manage the *Fons d'Inversió en Tecnologia Avançada (FITA)* to invest in deeptech companies emerging from the research system.

Acknowledgements to institutions

We would like to express our thanks to the following institutions for their availability and for providing us with data and information to prepare this snapshot:

TECNIO Association

CERCA Centres

Ministry of Research and Universities – Government of Catalonia

Catalan Foundation for Research and Innovation

SECPHO

Universitat de Barcelona

Universitat Politècnica de Catalunya

Thank you!

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