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REPORT
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The life sciences and
healthcare sector in
Catalonia

2022 BioRegion Report

2022

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Summary

Preface

1 Overview and key indicators

- The healthcare innovation, research and investment ecosystem in Catalonia 5
- Slight growth in macroeconomic indicators 6
- Catalonia, the top region in Spain in exports of industry products 7
- Foreign Direct Investment in Catalonia is on the rise (FDI Markets) 8
- +50% of the main multinationals in the industry are present in Catalonia 9
- The creation rate of companies is slowing down, but investment firms are increasing 10
- The new and forthcoming initiatives and/or facilities strengthening the ecosystem 11

2 Investment and funding in startups and scaleups

- Record funding: almost €450 M in investment raised, more than 75% from venture capital 13
- New record for investment in medtech and biotech 14
- The scale up of rounds and exits in the BioRegion 15
- Diversity in investment and growth by subsector 16
- Exceptional number of M&As and new IPOs 17
- 95% of the venture capital raised involves international participation 18
- Growing attraction of international investment firms 19
- Strong international connections and pull of investment firms established in the BioRegion 20
- The importance of megarounds in the growth of ecosystems in Europe 21
- Investment in deeptech in the BioRegion has grown fourfold over the past five years 22

3 Science and technology assets

- Catalonia, in the European top 5 in scientific publications and competitive European funding 24
- An increase in the clinical pipeline and licences 25
- Catalonia, European and world leader in clinical trials 26
- An approach to the healthtech pipeline in Catalonia 27
- Transfer of research centres in spinoffs 29
- Gender inequality in the sector in figures 30
- 10 gender recommendations for the life sciences and healthcare sector in Catalonia 31

4 Additional insights on business activity

- R&D investment by the pharma industry and medical technologies in Catalonia 34
- Catalonia is home to 46% of all medicine production plants in Spain 35
- Healthcare technology manufacturing in Catalonia 36
- Collaboration and R&D agreements in the industry 37
- Proposals to tackle industry-based challenges 38

5 Market Access

- Market access by innovative pharma molecules (2012-2022) 41
- Access to the public and private market by Catalonia headquartered medtech startups 42
- Conclusions 43

6 Methodology

Sustained growth and record funding in times of a change of model

Thirteen years after publishing the first edition of the BioRegion report -initially biennially and annually since 2020- this has become the most extensive and solid analysis of the assets, the achievements and the trends of the life sciences and healthcare sector of Catalonia in an international setting.

Looking back over past years offers interesting perspectives of the evolution of what is, according to the *EMEA Life Sciences Cluster Outlook of 2023*, an established ecosystem situated among fast movers in Europe, especially thanks to the group of startups. This retrospective leads us to the introduction to the 2017 report in which Biocat shared its vision of the future: achieving 500 million in investment in the BioRegion by 2025. It has been in 2022 when, thanks to a total funding (+€445 M) promoted by the the medtech Impress first megaround (€122 M), investment in the BioRegion came close to this figure envisioned for the scaling up of the ecosystem. We shall continue to work towards an achievement that belongs to the companies in the sector but that we can consider as pertaining to an entire ecosystem that is growing, transforming, adapting, and becoming stronger.

Catalonia, and especially Barcelona, attracts technology hubs, thanks to the availability of highly qualified talent, internationally renowned hospitals, the group of research centres, competitive business costs, and one of the best qualities of life in the world. Observing the timeline for the year (see page

11), one or more items of news regarding the drive of the BioRegion in the creation of opportunities for technology, deeptech, medicine, and the creation of jobs in the sector have been released every month in 2022. An unstoppable activity in an international context of recession that, this year, has not had a direct impact on the global indicators for the sector.

Reindustrialisation, sustainable and equal

Looking back, the 2021 edition includes mention of the disruption from COVID. In the 2022 edition, mention must be made of the Russian invasion of Ukraine, a war that did not exist when the previous report was published. This observation shows our limitations when making forecasts in complex systems such as innovative ecosystems. However, we can consider that two of the major challenges of Europe -and, therefore, of the BioRegion- with regard to what remains of the decade shall be the transition towards climate-neutral societies and the move towards resilient and equitable industrial competitiveness.

The life sciences and healthcare industry is key for Catalonia in this challenge of competitive industrial transformation. The sector continues to grow, in line with the evolution of recent years, in terms of both turnover and employment. With €7,780 M, the sector accounts for around 10% of all Catalan exports, growing in volume and in percentage in comparison with Spain as a whole in relation to last year. There is a clear opportunity in Catalonia to increase the production capacity of this industry and for it to lead the way towards the sustainable development goals. The “status quo” is no longer an option.

Europe is facing the crises from an outlook of

sustainability and inclusion. In the health sector, this means reinforcing technological independence, and investing agile and intelligently in talent, infrastructure and instruments. At a time when structures, both future -which are still self-assembling- and past - which are being disbanded, coexist, the industry based on deeptech and, more particularly, that of health, is essential in redesigning value chains that embrace possibilities regarding technology and sustainability, as well as comprehensive approaches to human and animal health and the environment -one health- which shall be key to tackling future challenges.

More specifically, the digital health technology sector plays a crucial role for this reindustrialisation of Catalonia, leading process automation, promoting connectivity and the creation of distributed infrastructures and computing technologies, applying artificial intelligence to new diagnostics and treatments or driving the entire advanced therapies value chain. These new niches are new opportunities for the reindustrialisation of Europe and Catalonia, and new, inclusive and equal spaces for talent. We are doing so here by providing the Report with indicators involving [a lack of] equality in the sector and calling for the necessary involvement of all agents in the system through a decalogue of recommendations to reduce the gender gap.

Future challenges

The digital transformation of organisations and health systems is lagging quality. The data is there, but not in a sufficient quantity. Furthermore, if the data is not connected, it is not organised and activated, this leads to health systems that attempt to turn this knowledge into more personalised, people-focused medicine without yet meeting their

goals. A lot of the many different digital solutions, which make this field one of the most dynamic and with most potential, must combine evidence with regulatory compliance regarding safety and privacy. And the regulatory mechanisms or those providing market access to health technologies must not become a bottleneck preventing the solutions from reaching patients. A fast track must be developed and implemented so that the digital tools and medical devices reach the health system quickly and agilely, once their utility, efficacy and safety have been proven. And above all, support is required through adequate funding to ensure this digital transformation is possible.

Technological independence must be strengthened and the entire supply and value chain must be ensured in areas such as biomanufacturing and biological medicine production. Investing intelligently in talent, infrastructure, instruments, adoption, sandboxes (to test new regulatory processes), testbeds (to pilot new manufacturing processes) without abandoning the viewpoint of social impact and circular economy.

Without in-depth industrial transformation, it is impossible to meet the goal of a strong, more sustainable, circular and regenerative Catalonia and Europe. This future scenario is the only one possible. The specific changes must be implemented in terms of finance, institutional governance, and innovation policies in order to progress towards the goal of health and social and global welfare that we plan to meet within one generation.

1 Overview and key indicators

Photograph: Barcelona



The healthcare innovation, research and investment ecosystem in Catalonia

At 2022, the life sciences and healthcare sector in Catalonia – what is known as the BioRegion – includes over 1,350 companies and 91 research entities established in the region. The ecosystem is mostly concentrated in the metropolitan area of Barcelona and, along with healthcare services*, has an economic impact of 8.7% on Catalonia’s GDP (4.25% industry and 4.45 % health services).

*Not included in the graph

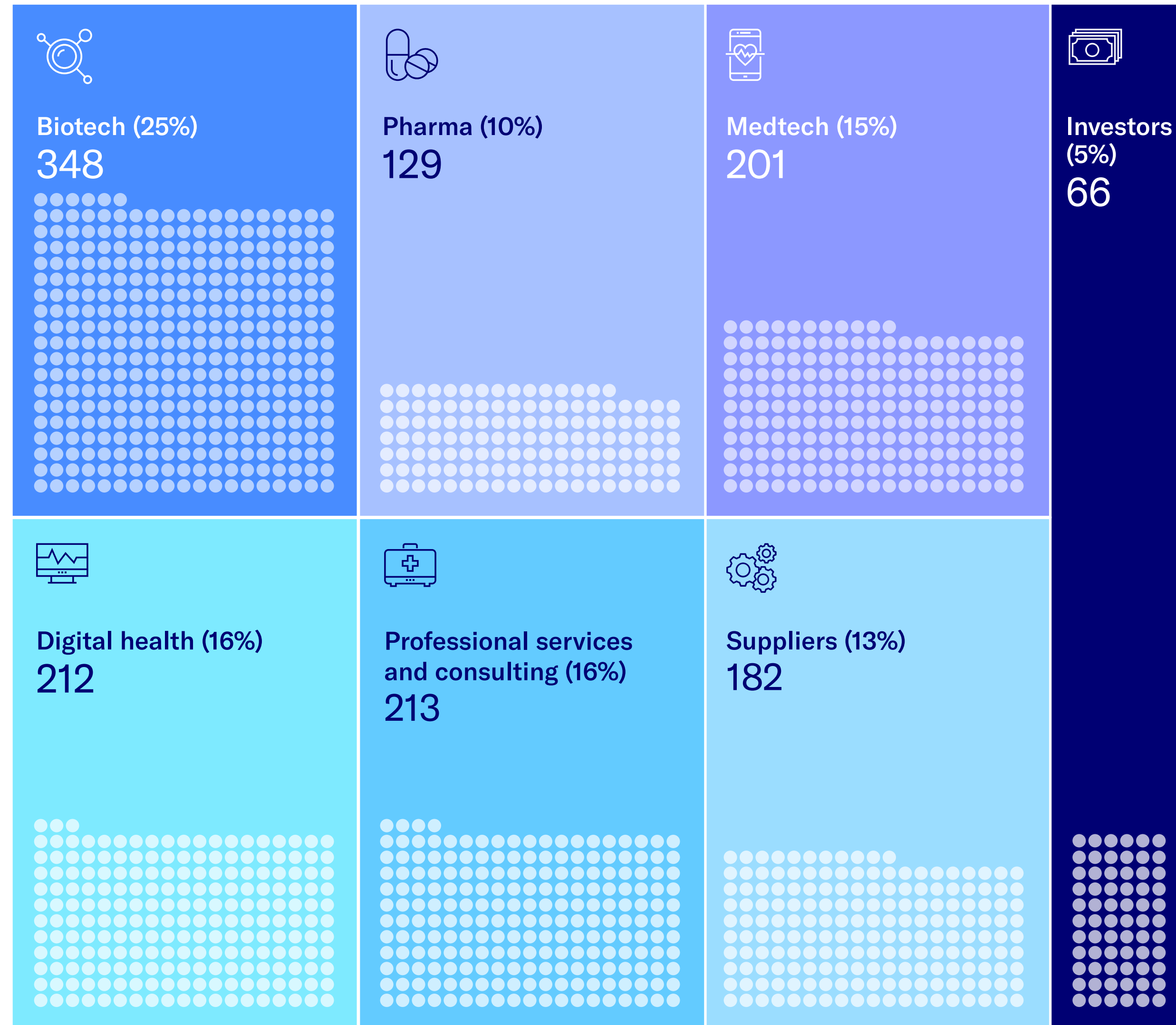
Turnover from other innovative industries in Catalonia

ITC and digitisation	€30,000 M
Life sciences and healthcare	€21,976 M
Automotive	€19,400 M
Chemicals and plastics	€18,543 M
Smart cities	€10,455 M
Silver economy	€9,750 M
Beauty	€9,000 M

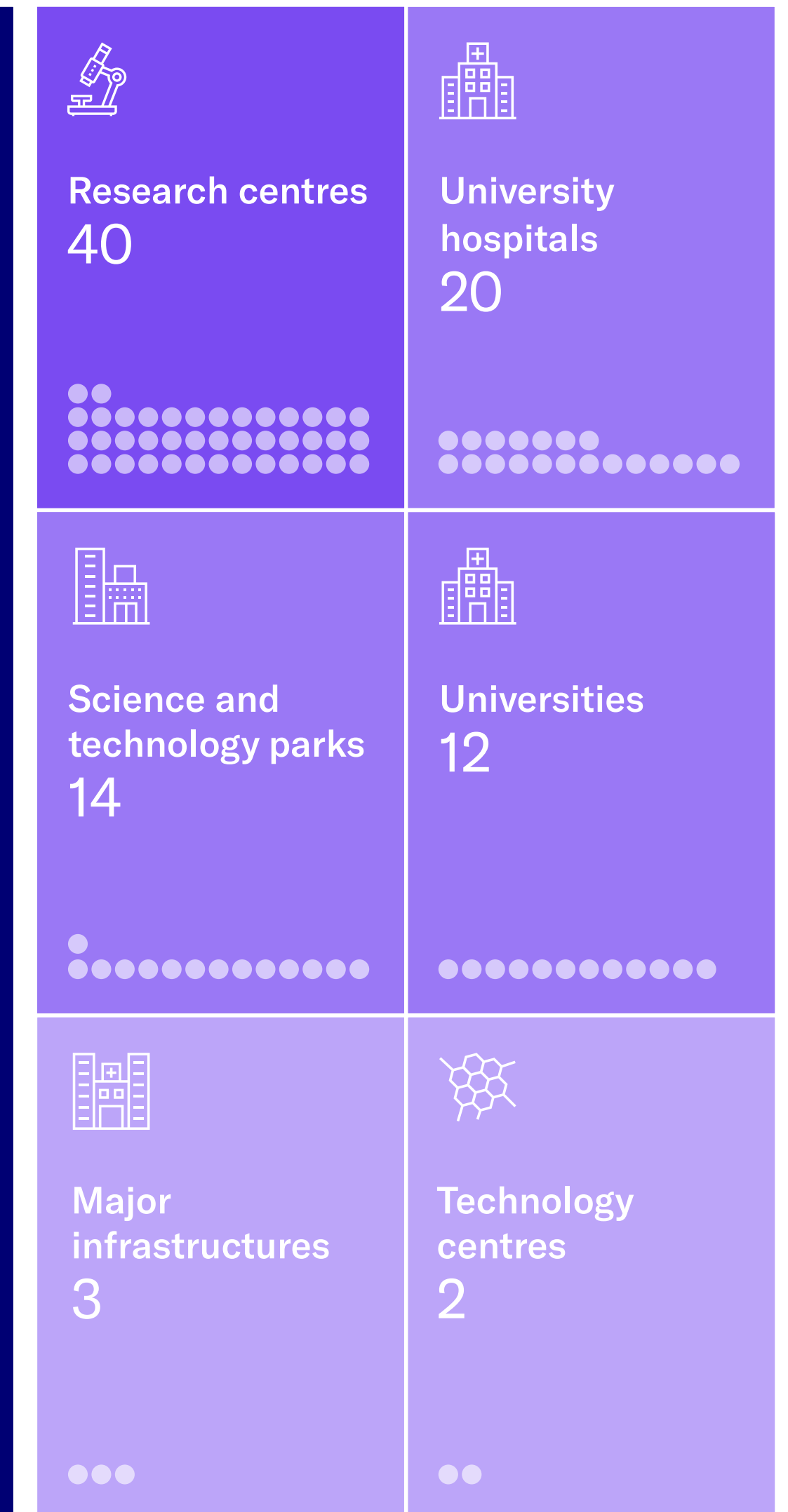
The macroeconomic, investment, research and innovation indicators regarding health for the whole of the ecosystem in 2022 mostly grew positively, strengthening the notable position of Catalonia both within Spain and internationally.

Map of the BioRegion of Catalonia ecosystem

+1,350 companies



91 research institutions

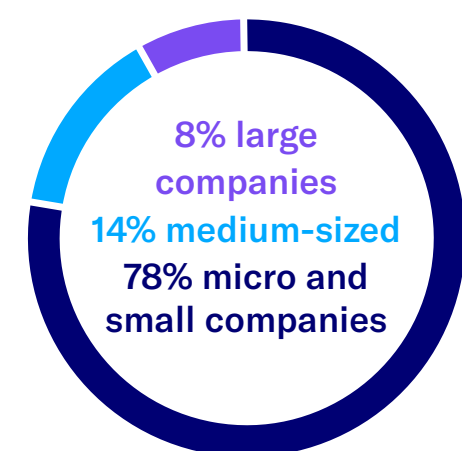


Slight growth in macroeconomic indicators

In line with the evolution of the past few years, turnover and employment indicators for the sector grew in a similar manner in 2021 to that of the annual average (CAGR), at approximately 3%.

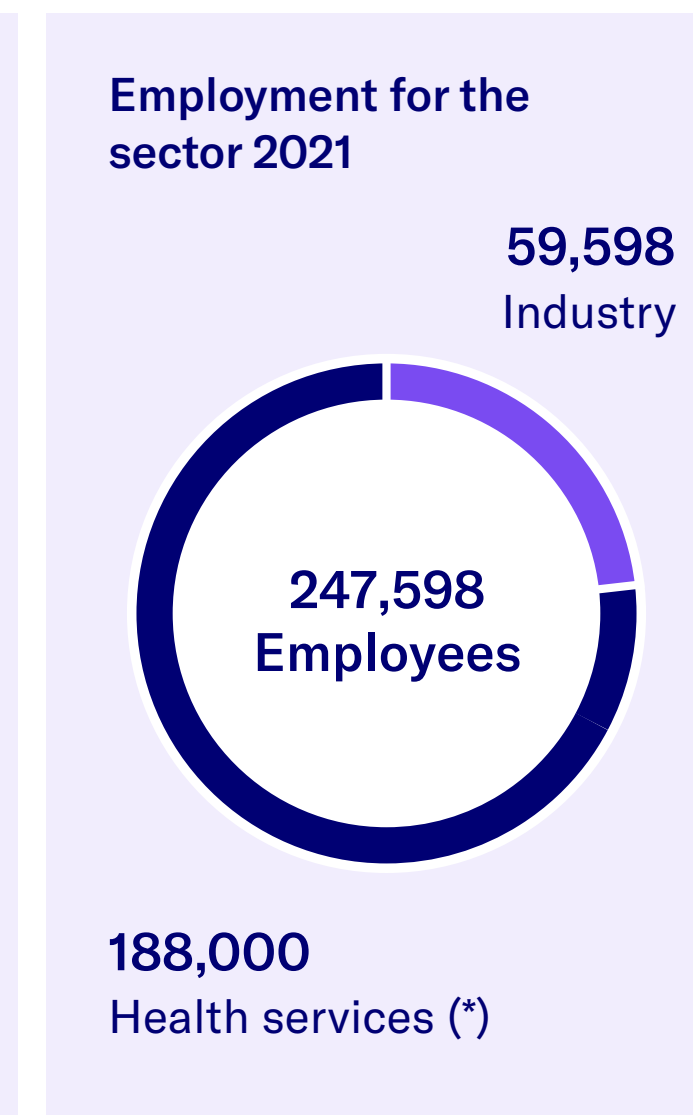
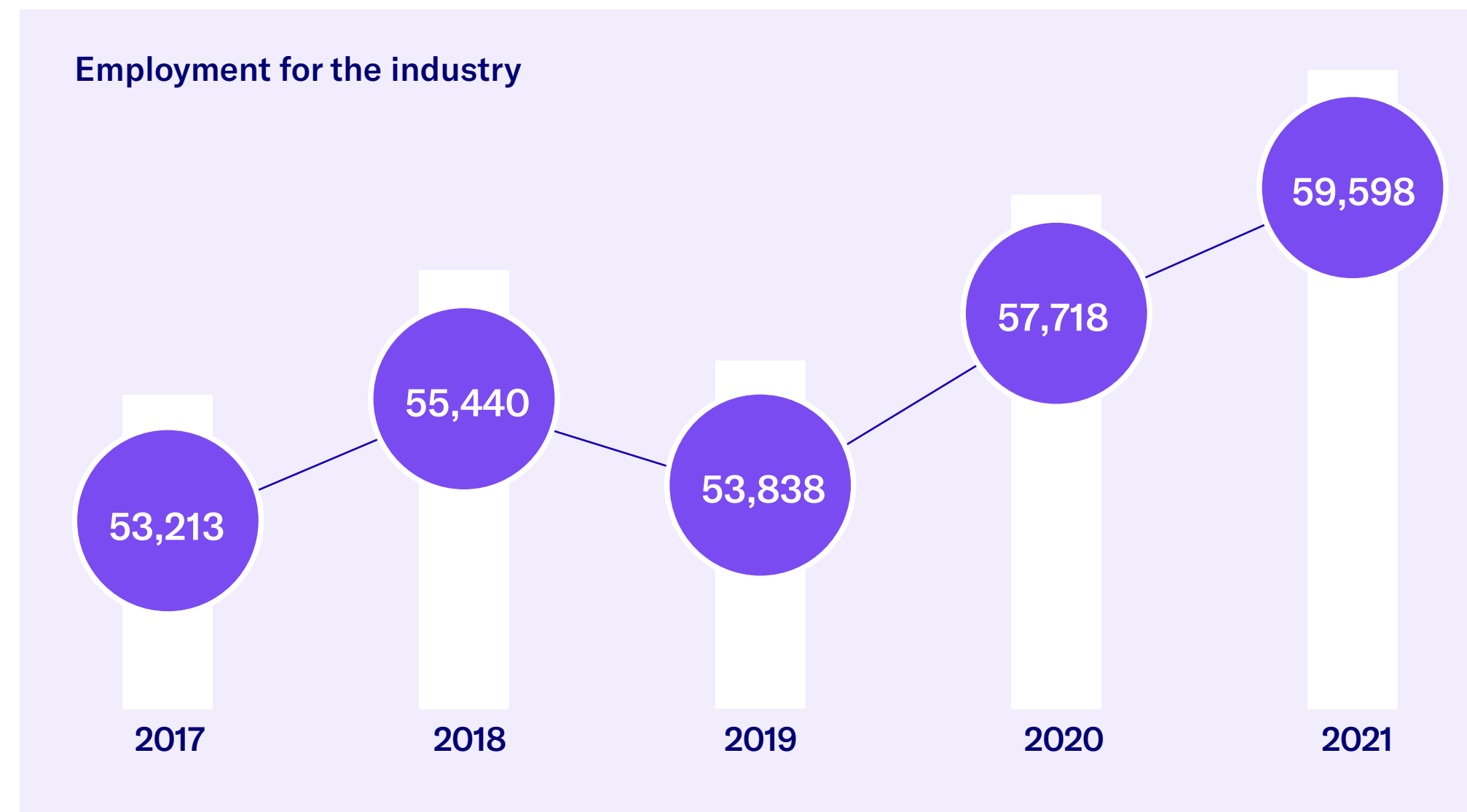
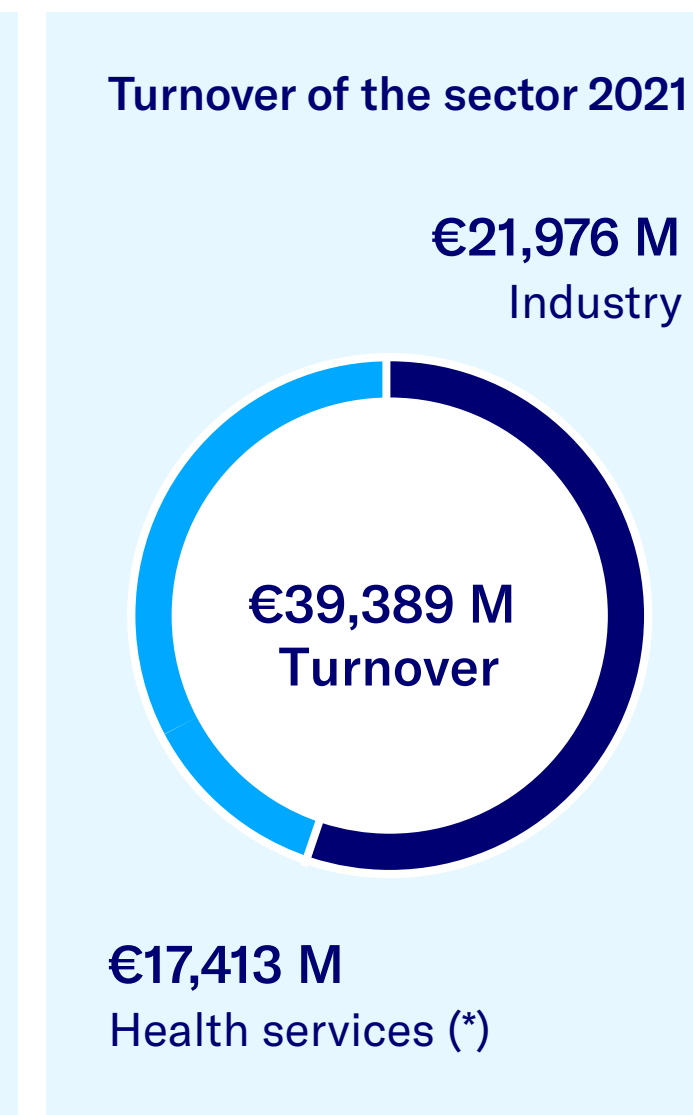
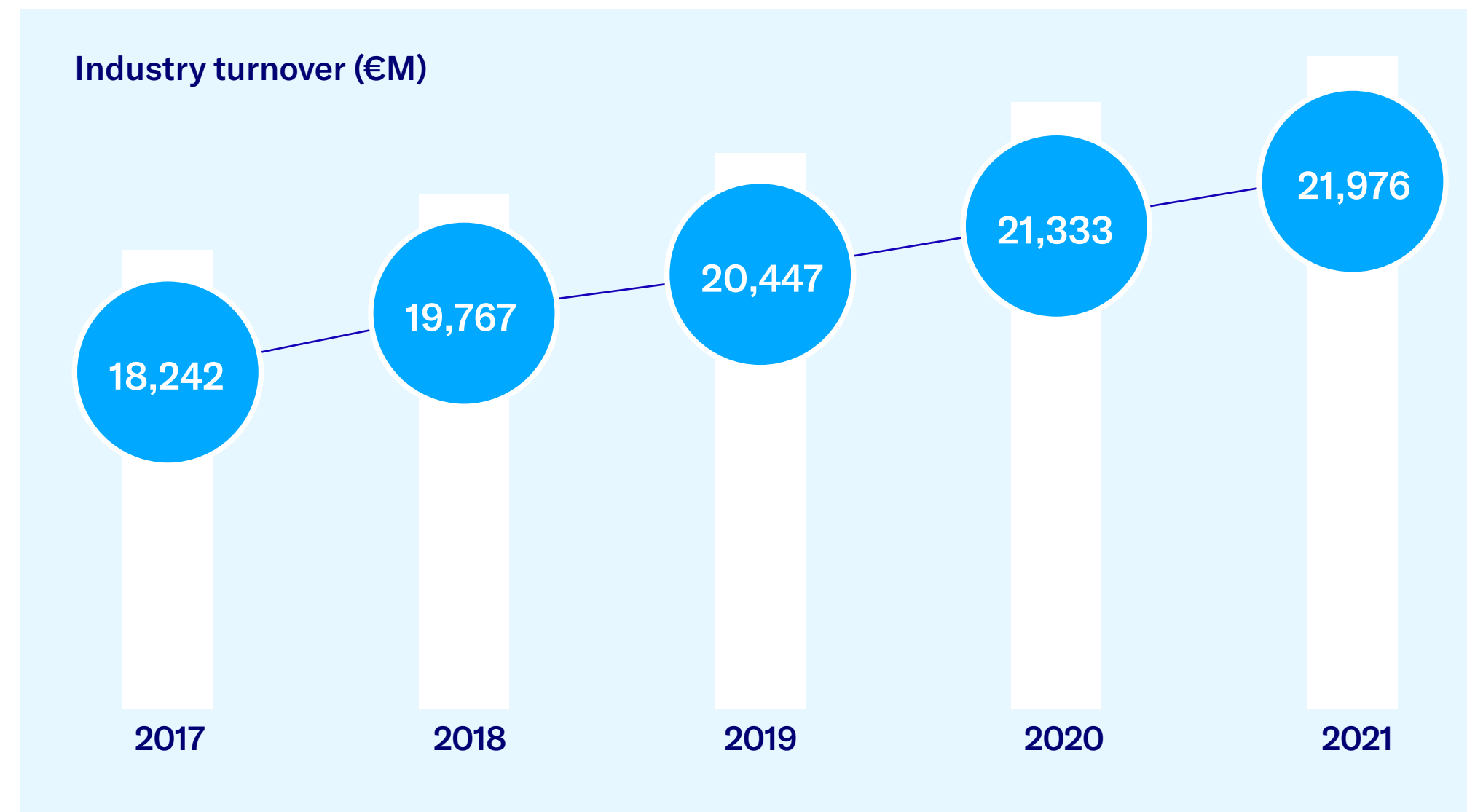
As is the case every year, the pharma industry stood out in terms of turnover, accounting for 47% of total turnover. The increase in the digital health (+16%) and supplier (+37%) segments is also worth noting, along with the drop in medtech (-16%) (probably due to the standardisation of sales of products and services related with COVID-19) and in professional services (-11%). Biotech turnover remains stable, although it must be remembered that only 60% of companies (animal health, agrifood, environment or industrial biotech) trade in this group and the remainder (those developing therapies for human health) do not.

In terms of employment, we have seen a 12% increase in the last five years in the industry, with a rise of almost 6,400 new jobs. Employing almost 247,600 people, the sector accounts for 7% of the employed population in Catalonia.



Size and location of the companies
Most of the business network in the sector is made up of SMEs, which account for 92% of the total. 94% are established in the province of Barcelona

Macroeconomic indicators



Industry turnover 2021

Digital health	€356 M
Professional services and consulting	€797 M
Medtech	€2,974 M
Suppliers	€3,476 M
Biotech	€4,001 M
Pharma	€10,372 M

Sources: Biocat, SABI 2021, Idescat 2019

* Health services: including the provision of healthcare and social services to healthcare institutions providing accommodation and offering diagnostic and medical treatments to patients.

Catalonia, the top region in Spain in exports of industry products

€7,780 M

Exports of life sciences and healthcare products (2021)

52.9% of Spain

Catalonia is the top exporting region of life sciences and healthcare products in Spain

9.6%

Of total Catalan exports

703

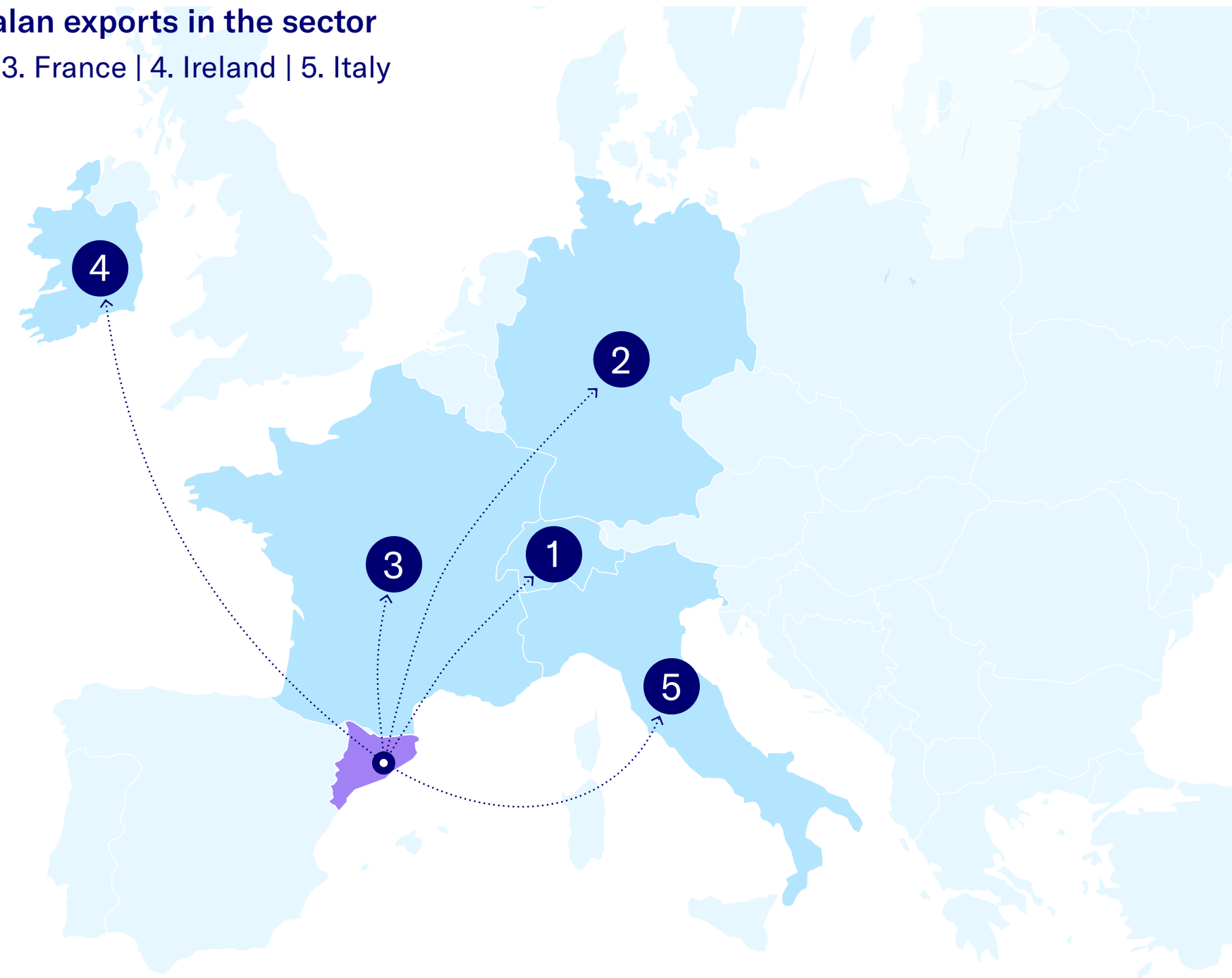
Companies regularly exporting life sciences and healthcare products (2021)

44%

Of the total number of exporting life sciences and healthcare companies in Spain

Main destinations of Catalan exports in the sector

1. Switzerland | 2. Germany | 3. France | 4. Ireland | 5. Italy



863 subsidiaries abroad of Catalan companies from the life sciences and healthcare sector



Illustrative, non-comprehensive list of companies present abroad.

Top class products exported



Medical and dental supplies
0.33%



Radiation, electromedical and electrotherapy equipment 7.53%



Pharmaceutical products
92.13%

Some of the main regular* exporting companies:



*Companies that have exported over the consecutive past 4 years.

Foreign Direct Investment in Catalonia is on the rise

Investments by foreign companies from the sector in the BioRegion between 2018 and 2022 accounted for a total of €689 M in direct investment and have created over 2,900 jobs. In 2022, investment was up 70% on the previous year, and employment 96%.

The projects provided with foreign direct investment include those attracted to R&D and industrial and technological investment projects, which mostly come from the United States, Japan and Europe.

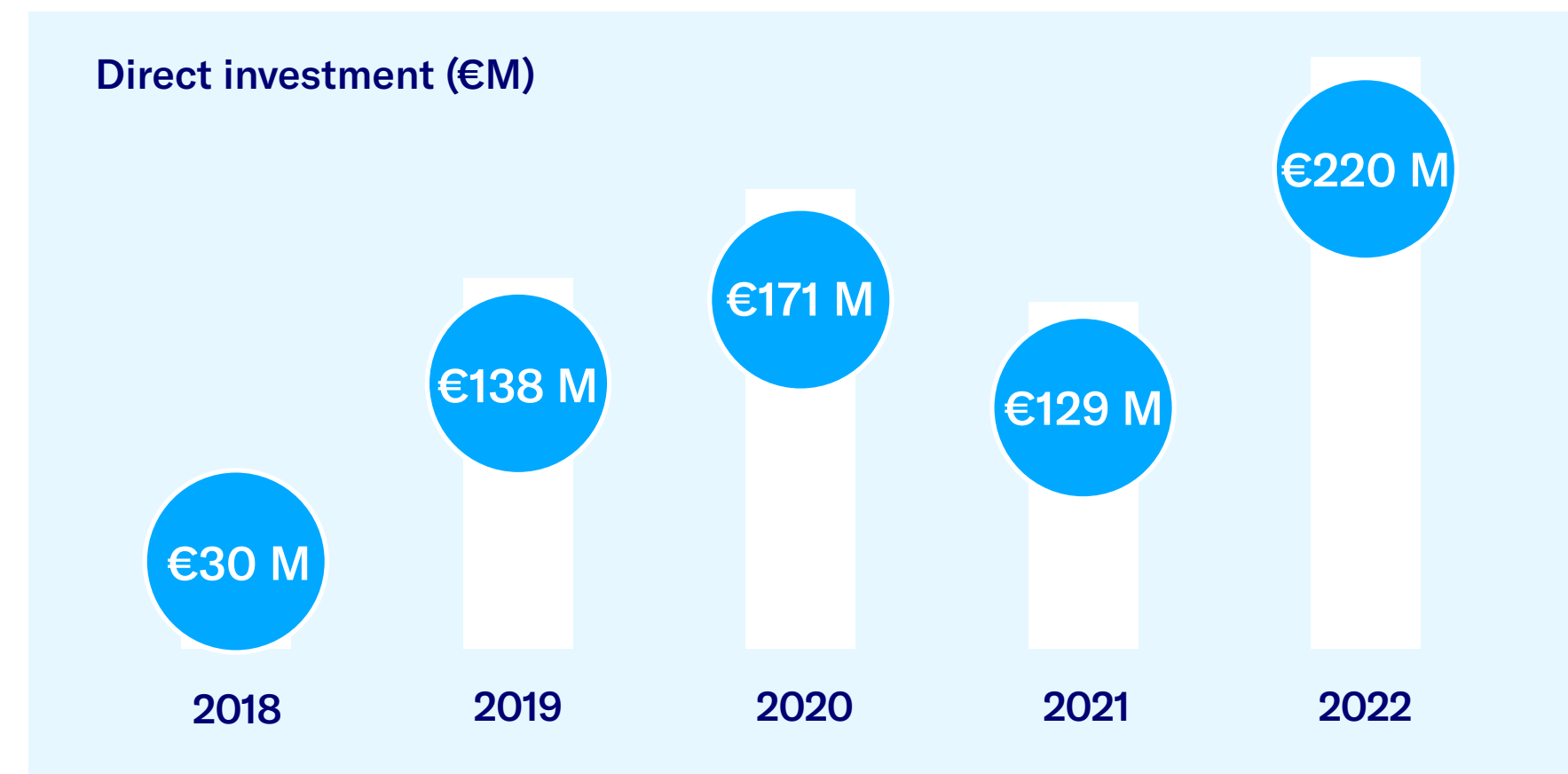
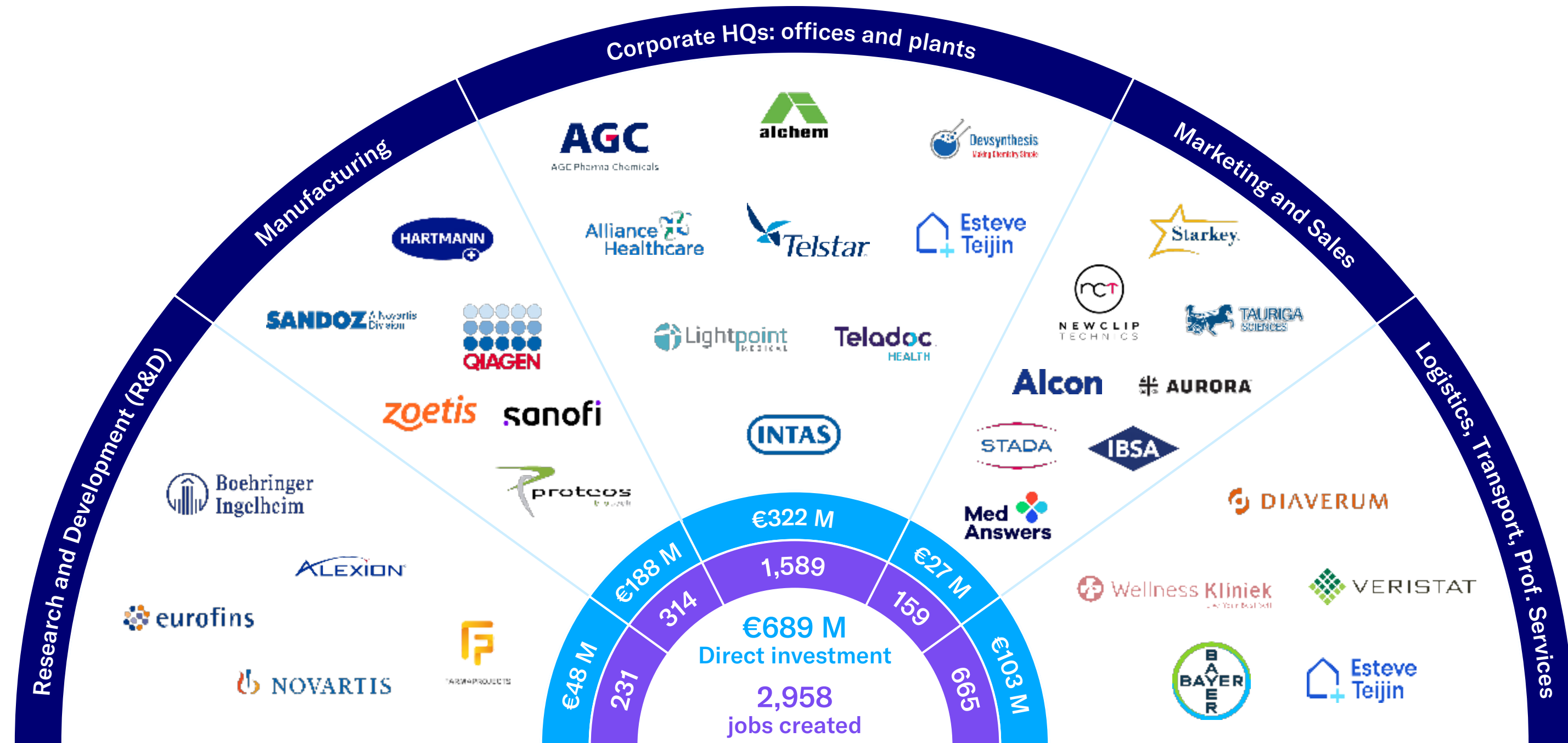
According to the prestigious Financial Times “FDI* European Cities and Regions of the Future 2022/2023”, Catalonia and Barcelona stand out as the region and the city with the best investment attracting strategy in Europe.

* Foreign Direct Investment

Top 10 countries in terms of investment and jobs (2018-2022)

Direct investment (€M)		Jobs created	
United States	€194 M	United States	1,041
Japan	€147 M	Japan	413
Switzerland	€84 M	India	348
France	€74 M	Germany	316
Germany	€67 M	France	309
India	€53 M	Switzerland	192
Netherlands	€33 M	United Kingdom	105
United Kingdom	€22 M	Netherlands	86
Belgium	€8 M	Sweden	84
Canada	€2 M	Belgium	30

Foreign Direct Investment in the BioRegion (2018-2022)



Source: ACCIÓ based on FDI Markets

+50% of the main multinationals in the industry are present in Catalonia

53% of the main international companies in the sector have headquarters in Catalonia*, which is also home to 50% of the Spanish pharma industry, traditionally an extremely important piece of the Catalan industrial network.

Leading companies in the European and US pharma industry have subsidiaries and production centres in Catalonia and, more recently, a growth in the extension or installation of research, innovation and technology hubs has been observed. This is the case of the biopharma company AstraZeneca, Alexion, which opened a hub for the development of medication for rare diseases in Barcelona in 2022, along with other companies such as Novartis, Boehringer Ingelheim, Sanofi and Merck.

Barcelona has become the preferred location due to a combination of factors, such as the availability of highly qualified talent, an ecosystem of internationally renowned research centres and hospitals, competitive business costs and incentives, and a great quality of life.

Of a total 9,155 foreign companies with registered offices in Catalonia (recorded to date), 1,733 deal in technology, which is 26% higher than in 2019. Since 2018, over 30 large companies have created or increased their work spaces and qualified jobs in Catalonia.

* ACCIÓ, based on Orbis (CNAE 21, 325, 266).

Main multinationals established in Catalonia

Headquarters in the BioRegion

Subsidiaries and/or Innovation centres in healthcare

Other multi-sector innovation centres installed in (2018-2022)

Some of the multinationals established in the BioRegion of Catalonia

The creation rate of companies is slowing down, but VC firms are increasing

The annual creation rate of new companies in the BioRegion – which remained at an average of around 55 over recent years – dropped to 37 in 2021, probably due to the COVID-19 pandemic of 2020. Despite not having a more stable account until the 2023 Report, a growth is now being observed in the % of spinoffs stemming from research centres over the past two years.

The digital health segment accounts for between 30% and 40% of the total number of new companies recorded since 2013, with an average of 20 new companies per year. Of a total 212 digital health startups active to date, 41 (19%) are spinoffs from universities, research centres, technology industries and hospitals.

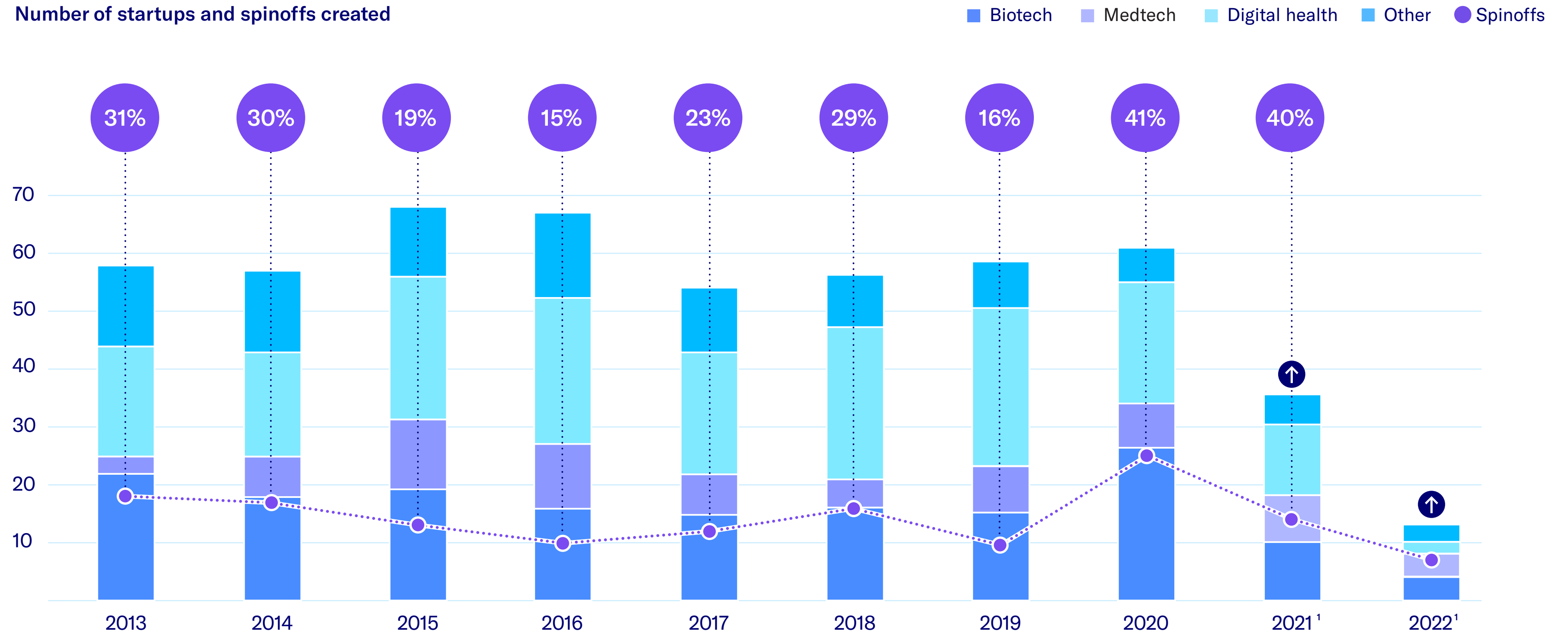
The evolution in the growth of the number of venture capital firms specialising in life sciences and healthcare established in Barcelona - which has increased fourfold over the past 10 years - has been included in the graph. Along with the general investors that are taking an interest in the sector, these are one of the key factors in helping boost the new companies during the different phases of growth.

% of startups founded or run by women ↘

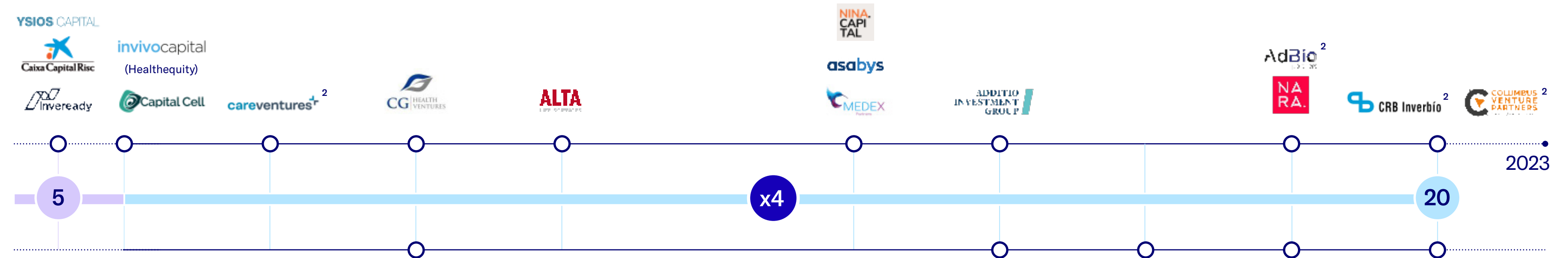
25% 2013-2017

32% 2018-2022

Number of startups and spinoffs created



Specialised investors



Generalist investors



Note: The graph includes investors taking part in funding rounds for a sum equal to or above €1 M, and funds created after 2020 with a minimum of €20 M.

¹ The process to detect activity by new companies was not set up until two years later, which is why the 2021-22 indicators are yet to be completed.

Source: Biocat

² They have opened an office in Barcelona.

The new and forthcoming initiatives and/or facilities strengthening the ecosystem

Activity has remained unremitting in the BioRegion of Catalonia throughout 2022, and the launch or the announcement of new infrastructure and facilities in addition to those that already exist continues to support excellence, innovation, transfer, and social impact.

Initiatives and facilities promoted in 2022 in the BioRegion

■ An initiative by the Administration ■ Department

January 2022 (An initiative by the Administration): Creation of the Adoption and Innovation Subcommittee promoted by the Health Department and coordinated by Biocat, with the goal of designing and agreeing to the necessary circuits and instruments to promote and streamline the adopting of innovation in the system.

January (Department): The Government of the Generalitat has created the Investment Funds in Advanced Technology (FITA), a new, 55-million-euro venture capital fund to promote scientific research and entrepreneurship.

March (Department): Launch of the Can Ruti Biomedical Campus project to build a biomedical research hub that includes all agents from Barcelonès Nord and Maresme.

May (An initiative by the Administration): Start of business at the Central Catalonia Life and Health Sciences Research and Innovation Institute (IRISCC), a new biomedical and healthcare research centre that brings together the biomedical research activity in Central Catalonia.

June (An initiative by the Administration): Start of the building work for the Caixa Research Institute, the first research centre to specialise in immunology in Spain. It will focus on the study of the most prevalent diseases, including neurological, oncological and infectious diseases.

July (An initiative by the Administration): New research building at the UPC Diagonal-Besòs de Campus for research into energy, sustainability, and biomedical engineering. IBEC, IREC and the university's research groups are to be based here. Foreseen opening date: 2025.

July (Department): The BSC-CNS is to house the MareNostrum 5, the most powerful supercomputer in Spain and one of the most advanced in Europe. It will also be home to one of the first quantum computers in Europe. Foreseen opening date: 2023.

June (An initiative by the Administration): Start of the Functional Plan for the future Girona Health Campus, where the new Josep Trueta University Hospital is to be located along with the UdG and IDIBGI Schools of Medicine and Nursing, among other facilities.

June (Department): The opening of the SJD Pediatric Cancer Center Barcelona, the first singlespeciality paediatric oncology centre in Spain and the second in Europe, which will treat children with cancer from Catalonia and from other regions of Spain and around the world.

July (An initiative by the Administration): Resuming of the work for the second phase of the extension plan for the future Hospital del Mar. The extension to the hospital will provide the site with over 20,000 m2 more space. Foreseen opening date: 2030.

September (Department): The Government of Catalonia presents the National Industry Pact 2022-2025, the new programmatic agreement to transform the country's industrial model. This includes four key initiatives for the BioRegion of Catalonia to increase the importance of the sector within the Catalan economy.

October (An initiative by the Administration): Opening of the UOC Interdisciplinary Research & Innovation Hub, a new research building to be used entirely for innovation, transfer and entrepreneurship at the university, where digital healthcare places a leading role.

October (An initiative by the Administration): Launch of the Barcelona Aging Collaboratory Platform (BALL), the first 'Living Lab' in Catalonia, which aims to create solutions focused on the ageing of the population.

November (Department): The Government of Catalonia launches the Advanced Therapies Hub, a project coordinated by Biocat to make the BioRegion the leading advanced therapies (cells, genes, and tissue) hub in Europe, a key part of which will be the new Advanced Therapies Centre of Catalonia.

December (Department): The Government of Catalonia approves the Innovation and Health BioCluster at the Hospitalet biohealth hub to attract new companies related with medtech, biomedicine, and the pharma industry.

December 2022 (An initiative by the Administration): Launch of Pier 07 Healthtech, the new innovation space of the association Tech Barcelona to welcome startups from the life sciences and health sector, located in the centre of Barcelona.

December (Department): Decision to fund the IRTACReSA, the construction of a new high biocontainment facility (biosafety level 3 and 4), which is unique both nationally and internationally.

December (Department): The UPF and the Evolutive Biology Institute (IBE) present the architectural designs for their new buildings, which are to form part of the new Mercat del Peix, research area, along with the BIST building. The first stone of the complex is to be laid in 2023, and it is to open in 2026.

December (An initiative by the Administration): The Ministry of Science and Innovation announces the intention of the Fraunhofer Institute to set up headquarters in Catalonia. These will be the first headquarters in Spain for the most important applied research organisation in Europe.

December (Department): Start of the ALBA II project, a transition from the current synchrotron ALBA to a fourthgeneration synchrotron. The project will also include the Alba science, technology and innovation park, with space for research centres and businesses. Foreseen opening date: 2030.

2

Investment and funding in startups and scaleups

Photograph: Sant Joan de Déu Research Institute (IRSJD)



All the startups and scaleups established in the BioRegion were considered for this analysis. The concept of startups includes young, innovative emerging businesses that have received competitive and high-risk investment or funding during their initial or later phases. When a startup is successful and increases considerably and quickly any of the main business indicators (investment, products, markets, employees), it becomes a scaleup. See the Methodology section for further information.

Record funding: almost €450 M in investment raised, more than 75% from venture capital

Investment in healthcare startups and scaleups in Catalonia in 2022 surpassed all expectations, in a year marked by a generalised decline in investment and in values in the global markets. In this setting, the BioRegion has seen the first megaround (+€100 M) in history, starring the medtech company Impress. Two other biotech rounds (Minoryx Therapeutics and SpliceBio, +€50 M) have also helped add to this figure by doubling the historic records of previous years with a total of €445 M raised.

Venture capital (VC) remains the most important source of funding with €343.4 M (77% of the total raised), followed by competitive grants (12%), the stock market (4%), venture debt (5%), and crowdequity (1%). More competitive grants than ever were awarded in 2022 with €53 M in funding, almost doubling the figures of recent years thanks to the EIC Accelerator and the CDTI.

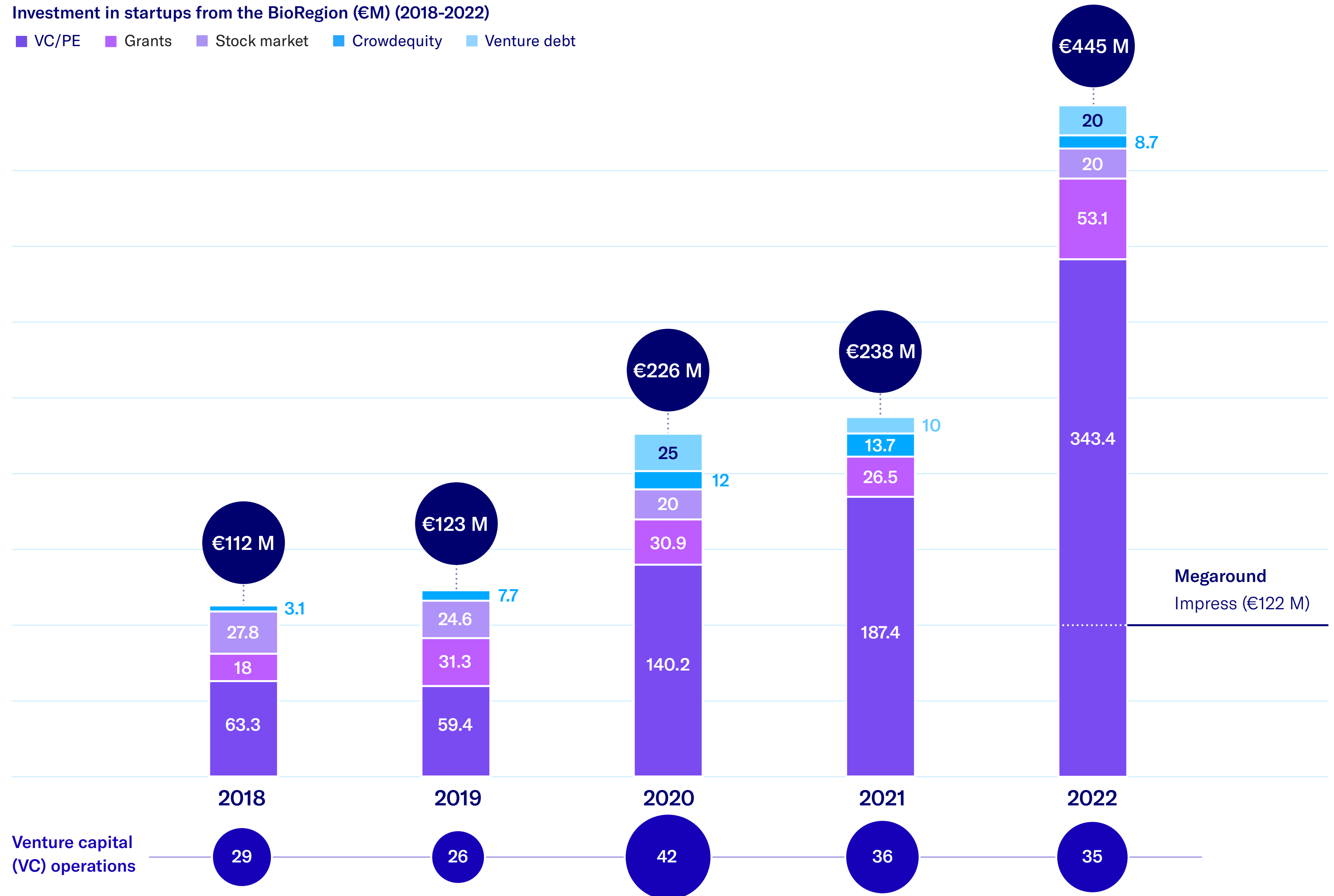
Note: The investment includes capital raised by startups and scaleups in Catalonia in the biopharma, medtech, digital health, and R&D services sectors. It also includes investment in startups working for the life sciences sector, such as suppliers, engineering, and professional service companies.

VC/PE: venture capital / private equity

Venture debt: funding for startups exclusively from the European Investment Bank (EIB)

Investment in startups from the BioRegion (€M) (2018-2022)

VC/PE Grants Stock market Crowdequity Venture debt



Source: Biocat

New record for investment in medtech and biotech

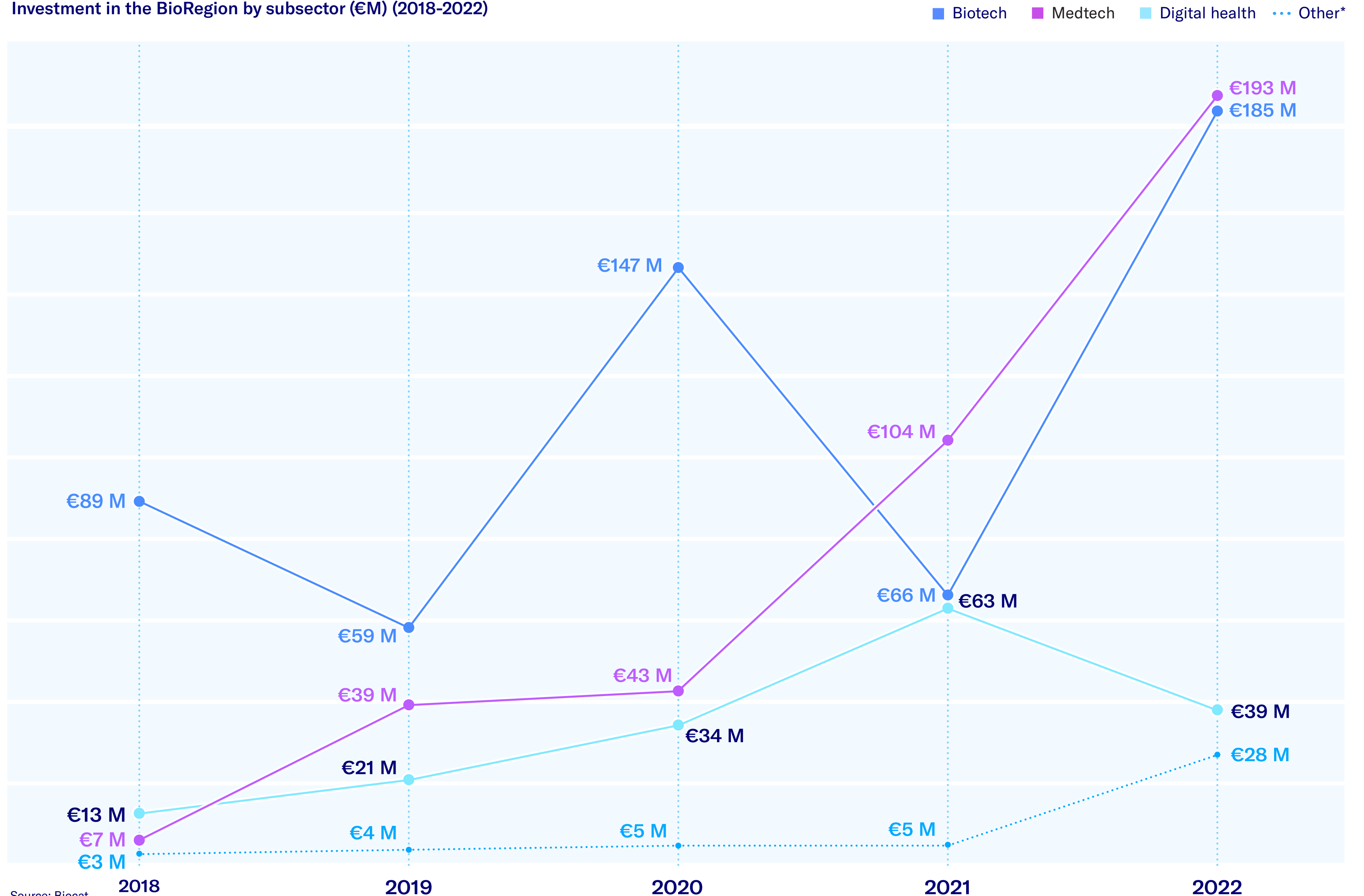
Medtech remains top as the main subsector to attract investment in 2022. This new record, with €193 M raised, consolidates the rapid growth of this subsector over the past five years. The unprecedented megaround of the dental health startup **Impress** (with €122 M) was the driving force behind this sum.

Biotech companies in 2022 also reached a new record and the funds raised increased threefold in comparison with the previous year. **Minoryx Therapeutics** – which is developing a drug for rare diseases - and **SpliceBio** - which is working on gene therapy programmes - have played a leading role in the two largest biotech rounds in the history of the BioRegion with €51 M and €50 M, respectively.

Investment in the digital health segment fell by almost 40% for the first time in five years, as was the case internationally. The rise in the number of operations in 2022 (25 in comparison with 21 in 2021) was not accompanied by the investment volumes of prior years.

Supplier and service companies also registered the record figure of €28 M thanks to the €22 M round of the cloud computing services company **Seqera Labs**.

Investment in the BioRegion by subsector (€M) (2018-2022)



Source: Biocat

(*)Other: professional services and supplier companies.

Note: Investment in biotech includes companies providing therapies, R&D services, and other companies with an impact on human health.

The scale up of rounds and exits in the BioRegion

The startups and scaleups in the BioRegion continue to escalate through funding rounds and business exits, especially over the past three years.

The three largest rounds in the history of the BioRegion took place in 2022: Impress (€122 M), Minoryx (€51 M) and SpliceBio (€50 M). Furthermore, the Impress round became the largest in the Spanish health sector. These and other major operations show the importance of collaborations and joint investments among the venture capital established in Catalonia and worldwide.

Beyond the major rounds this year, also worth highlighting is the increase in exits through 7 takeovers and a significant number of companies (10) that raised between €3-10 M, along with the group of 23 which raised between €1-3 M that will potentially escalate to future rounds in the coming years.

€1-3 M 2022



Source: Biocat

	2018	2019	2020	2021	2022
Exits					
Rounds					
+€50 M					
€30-50 M					
€10-30 M					
€5-10 M					
€3-5 M					

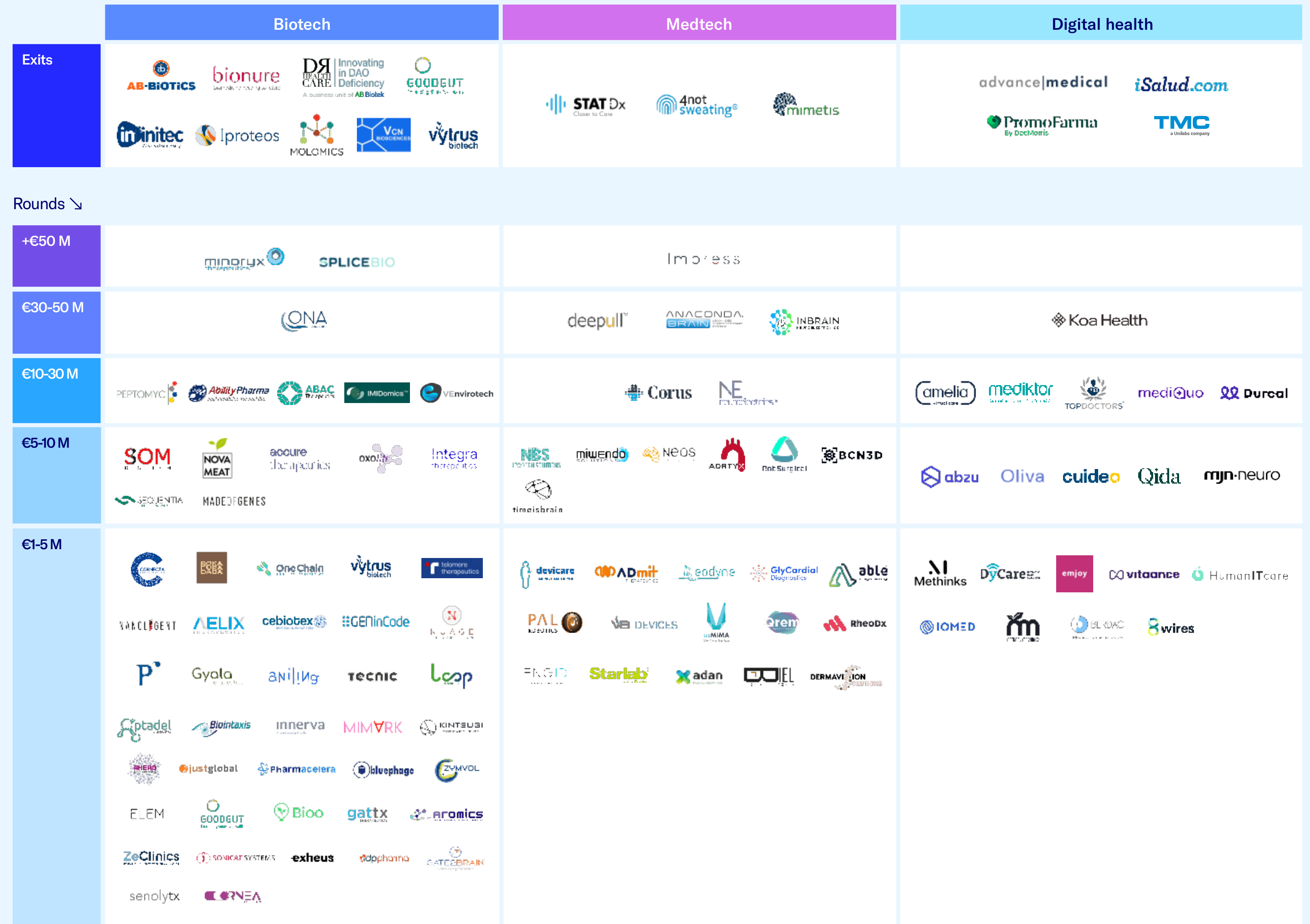
Source: Biocat Note: Operations involving venture capital, competitive grants, venture debt by the European Investment Bank (EIB), and crowdequity between 2018 and 2022 (both inclusive) are included.

Diversity in investment and growth by subsector

The previous rendition shows how startups and scaleups grew in terms of attracting investment during the 2018-2022 period. This figure offers another perspective: the subsector of the companies.

This shows good balance and diversity among segments in operations amounting to less than €50 M, although biotech stands out in terms of the number of rounds and exits due to its individual business model, where development times and costs require recurring injections of significant capital.

The most relevant digital health startups over the past few years (Doctoralia and Advance Medical) were taken over by major world players (Docplanner and Teladoc) instead of continuing to grow through funding rounds. Given the rate of technological progress in the digital sector and its interaction with the biological sector, it is only to be expected that new startups with large funding rounds will appear.



Source: Biocat Note: Operations involving venture capital, competitive grants, venture debt by the European Investment Bank (EIB), and crowdequity between 2018 and 2022 (both inclusive) are included.

Exceptional number of M&As and new IPOs

M&A (mergers and acquisitions) activity in the BioRegion has been surprisingly dynamic considering the global context. The generalised rise in interest rates, the decline in values, the freezing of investments, and the general feeling of economic containment have had no apparent impact on this type of operation. In fact, the number of M&As in the sector has risen from 12 to 20, primarily due to the increase in acquisitions of international companies by businesses with headquarters in the BioRegion.

In terms of IPOs, Vytrus Biotech and Labiana Pharmaceuticals were launched on BME Growth in 2022, the market specifically for SMEs, joining the other 5 Catalan firms listed in the life sciences and healthcare sector to date (NASDAQ and MCE).

Companies from the BioRegion on the stock market (to 2022)

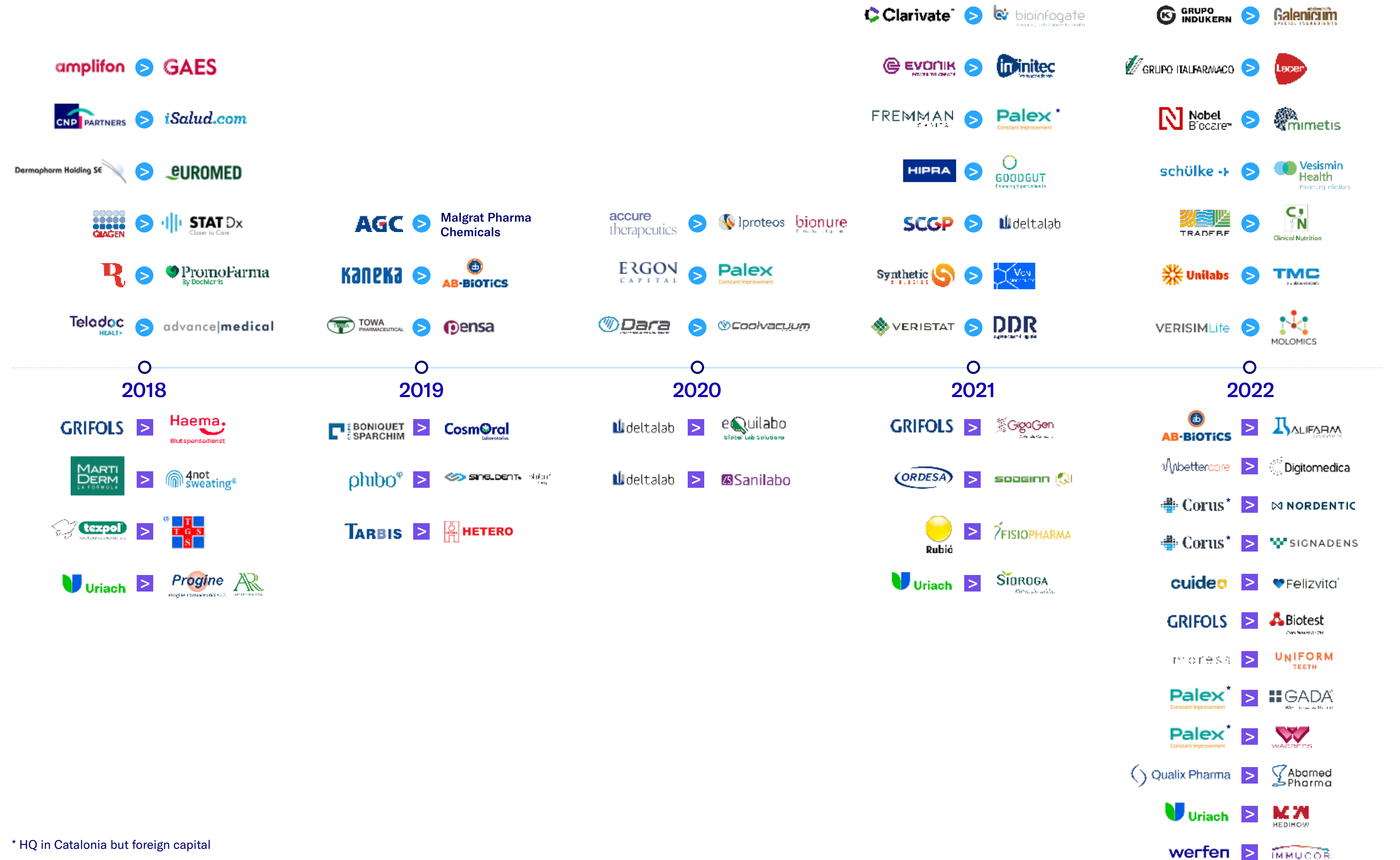
² (MCE: ALM)	¹ (MCE: GRF, MCE: GRF.P, NASDAQ: GRFS)	³ (BME: LAB)	³ (MCE: ORY)
² (BME: PANG)	² (MCE: RJF)	² (BME: VYT)	

¹ Listed on IBEX 35
² Listed on BME Growth

³ Companies with headquarters outside Catalonia but trading primarily in Catalonia

M&A Activity in the BioRegion (2018-2022)

Catalan companies acquired Acquisitions by Catalan companies



* HQ in Catalonia but foreign capital
Source: Biocat

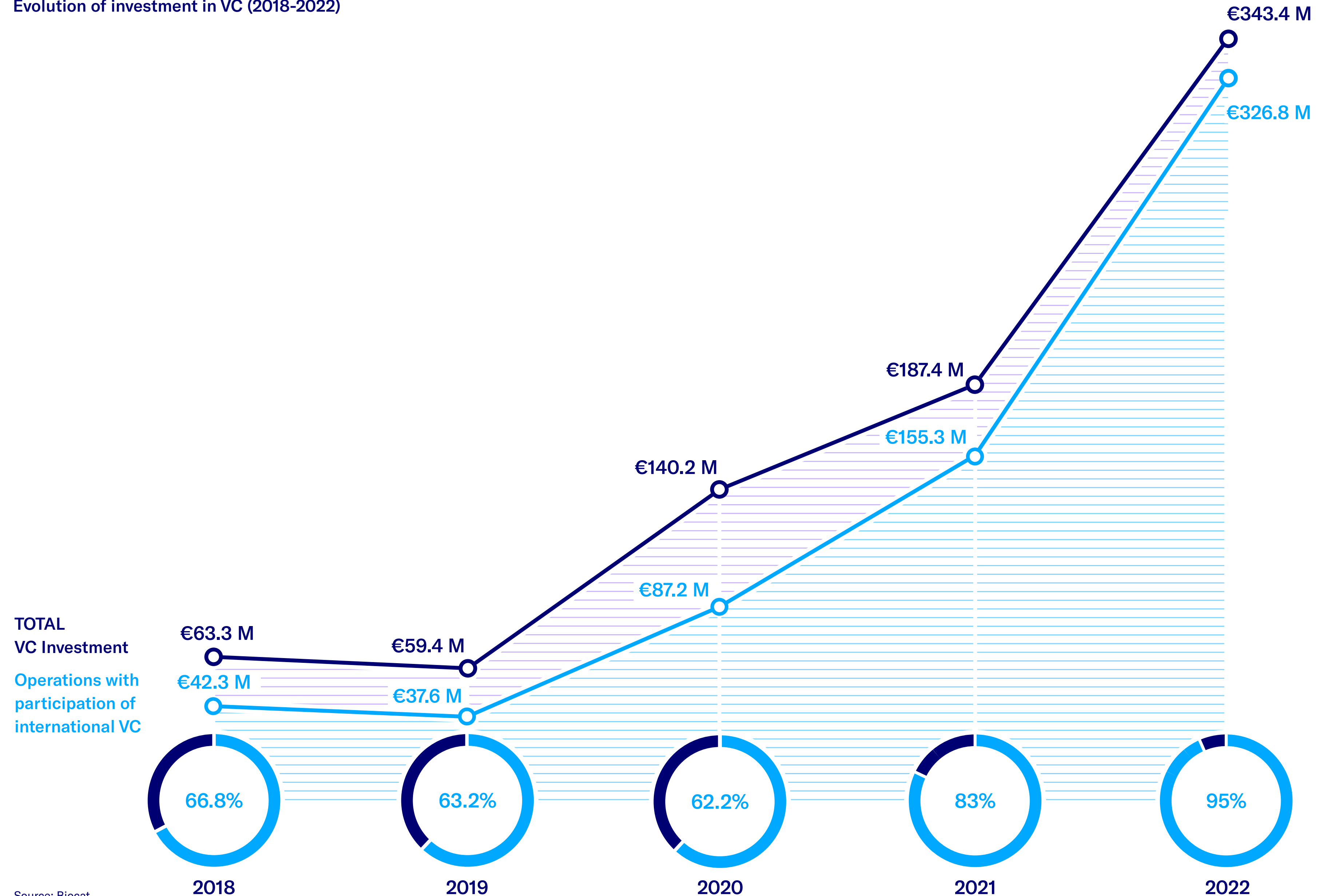
95% of the venture capital raised involves international participation

International venture capital has grown unstoppably over the past two years. Of the 35 operations identified in 2022, 56% (20) involved international participation and accounted for almost all the venture capital raised (95%, with €326.8 M).

The rising trend in international investment is a sign of the ecosystem's maturity in terms of the scientific-technological solidity of the startups and scaleups and of the talent of their teams, as well as the pull from specialist investors established in the BioRegion to promote joint investments in major operations.

Furthermore, for the first time in 2022, there were 11 operations by 100% international investors, mostly European but also from the United States, Brazil and Mexico. These companies - which raised €65 M - are: Seqera Labs, Inbrain Neuroelectronics, Medsir, Oliva therapy, Novameat, Time is Brain, Nanoligent, Elem Biotech, Dycare, Mediquo, and IMIDomics.

Evolution of investment in VC (2018-2022)



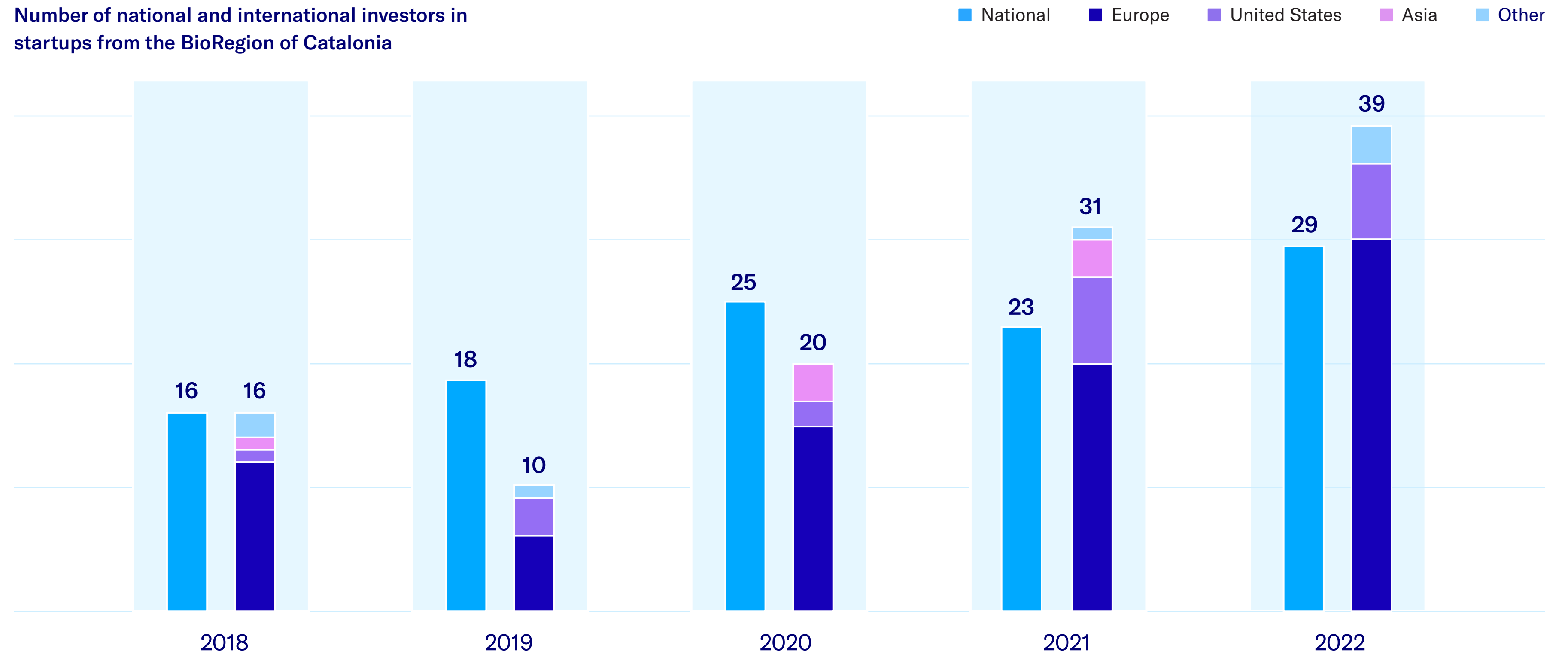
Source: Biocat

Growing attraction of international investment firms

The number of international investment managers investing in startups and scaleups from the BioRegion has increased threefold over five years to stand at 117. This increase occurred primarily during the 2020-2022 period when 50% of these investors were attracted (59), a much higher figure than the cumulative total of 2018 (37).

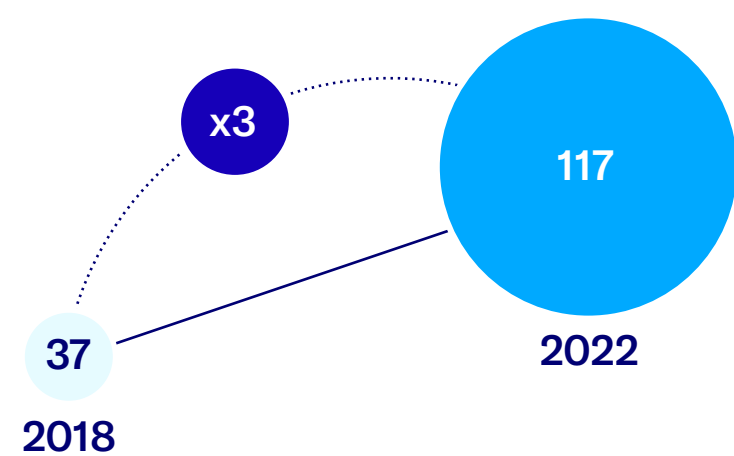
In 2022, 39 international investment firms were recorded to have invested in the BioRegion, which is another increase of 25% on the previous year. These investors include 24 funds that have invested for the first time. Most are from the United Kingdom, the United States, Germany, France, Luxembourg and Switzerland.

Number of national and international investors in startups from the BioRegion of Catalonia



Note: the different investment firms investing each year are counted. The same investor is only counted once per year.

Number of individual international firms that have invested in the BioRegion



Note: Only investment firms that have taken part in venture capital rounds. Each investor is only counted the first time it invests in the BioRegion.

Highlighted international investors



Highlighted international investors 2022



Note: National investors are those based in Catalonia and the rest of Spain.

Strong international connections and pull of investment firms established in the BioRegion

The strategy of collaborations and the pull of international funds to the ecosystem is shown clearly in this illustration, where it can be seen how the main specialised venture capital managers established in Barcelona (Ysios Capital, Caixa Capital Risc, Alta Life Sciences, Asabys Partners, Invivo Capital, Inveready, CGHealth Ventures and Nina Capital) have built an extensive network of connections with mostly European, American and Asian funds.

As a result of this collaboration, working with renowned international firms such as Kurma, Idinvest, Gilde Healthcare, Chiesi Ventures, Johnson & Johnson Innovation, and Fund+, among others, over €2,100 M have been raised in 57 investment rounds, €560 M of which have involved Catalan companies (STAT-Dx, Minoryx Therapeutics, Ona Therapeutics, Aelix, SpliceBio and DeepUI) spread over 22 operations. In December 2022, the sum of funds available in the BioRegion for new investments (without counting the capital paid up or that reserved for follows-ons) was in excess of €300 M* and, leveraged for future joint investments, is expected to help create new success stories in the BioRegion.

*Sum of capital available for new operations (for local or international companies) by the specialised venture capital firms established in Barcelona.

Top rounds by the main specialised VCs established in Catalonia and their international connections

- Asia
- Canada
- United States
- Europe
- Other



Top 10 VCs from outside Catalonia that have turned into more rounds with funds from the BioRegion ↘

Kurma Partners	
Idinvest	
Gilde Healthcare	
Forbion Capital Partners	
Johnson & Johnson Innovation	
Chiesi Ventures	
Columbus Venture Partners	
Fund+	
Roche Venture Fund	
Novartis Venture Fund	

Source: Biocat

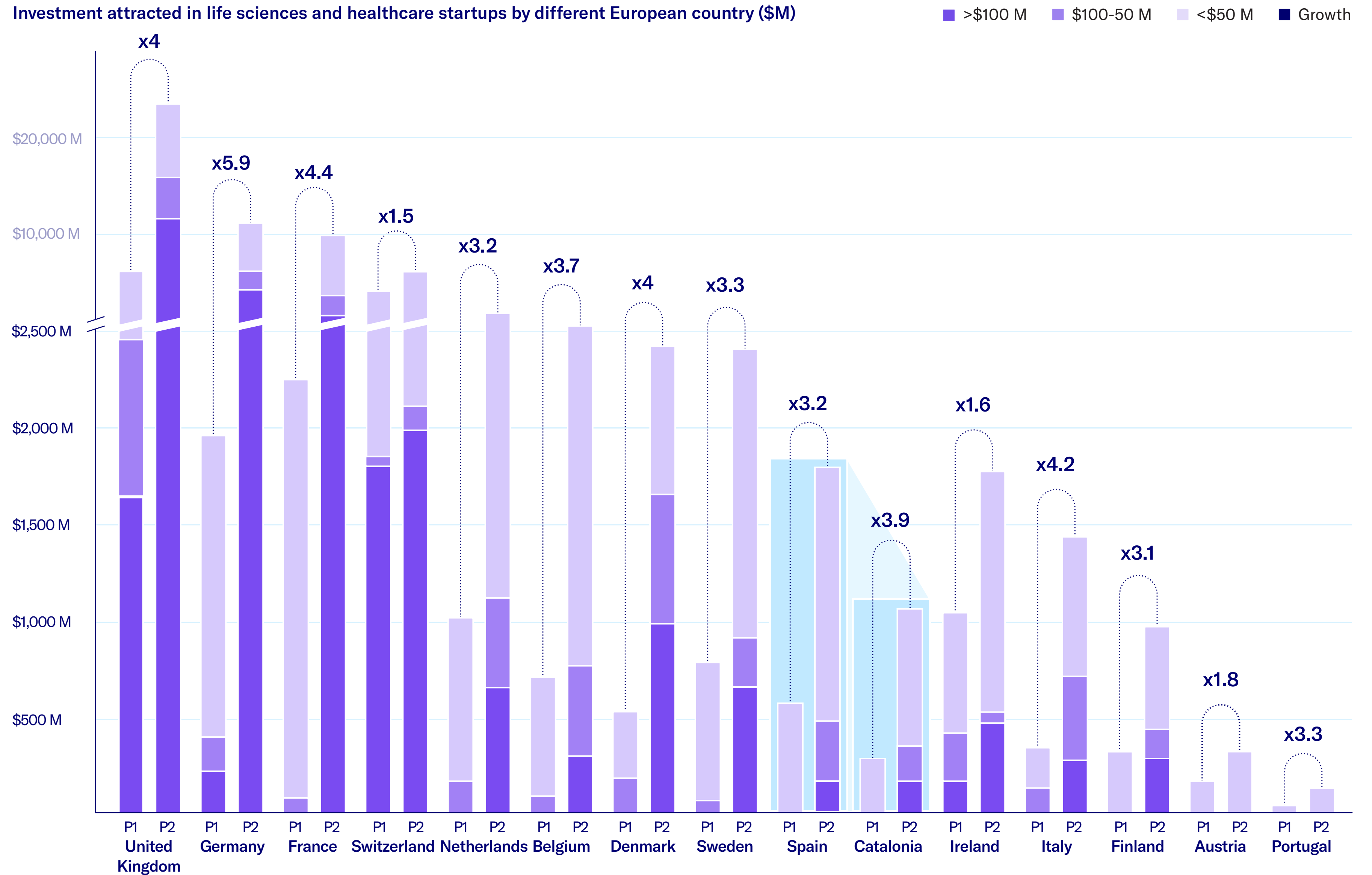
The importance of megarounds in the growth of ecosystems in Europe

Investment in life sciences and healthcare companies in Europe has continued to grow at different rates over the past few years, depending on the country in question.

This analysis shows that the 2018-2022 period recorded a significant leap in terms of the investment attracted in almost all countries, especially the United Kingdom, Germany, France, the Netherlands, and Denmark, where the presence of megarounds (rounds of over €100 M) and major operations must be noted.

The megaround of the medtech Impress in Catalonia and the remaining investment attracted accounted for 55% of the total raised in Spain, which was a far cry from the volumes raised in countries that we will refer to in other indicators.

Moreover, 3.9% of growth between the two periods indicates an evolution at a similar rate to that of leading countries.



P1: period from 2013 to 2017 (both inclusive)

P2: period from 2018 to 2022 (both inclusive)

Source: Dealroom, December 2022

Investment in deeptech in the BioRegion has grown fourfold over the past five years

The value of investments in *deeptech* around the world (primarily in biotech and artificial intelligence) increased fourfold between 2016 and 2020, and has a growth forecast of +€200 k M by 2025¹. In line with this trend, companies from the BioRegion have increased the investment attracted over the past five years by four, as shown in this figure that includes countries comparable with Catalonia. The 16 *deeptechs* have raised \$86 M through 20 operations that – despite not being particularly large – place Catalonia above countries such as Sweden, the Netherlands or Ireland. This is the case of **InBrain Neuroelectronics** (€17.5 M), **Durcal** (€8 M), and **Amelia** (€7 M). **Hospital Vall d'Hebron** and **Hospital Clínic** are among the most advanced hospitals in the world in terms of *deeptech*² technologies.

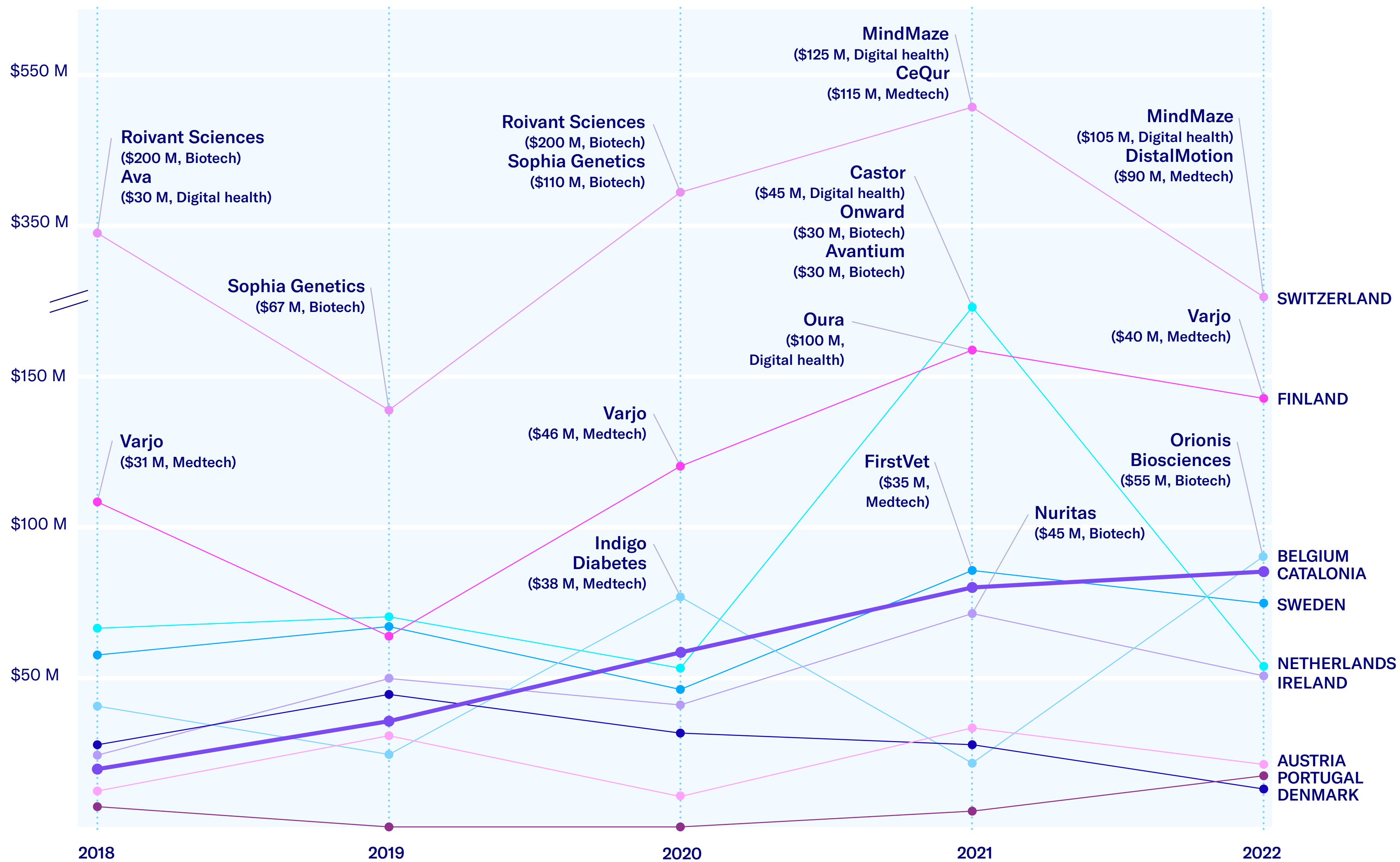
¹DeepTech Catalonia Report 2022 (ACCIÓ)

²Nesweek World Best Smart Hospitals 2023

Investment raised in deeptech in the top 5 European countries ↴

- United Kingdom (\$743 M)** Proximie (\$80 M, Digital health)
Oni (\$75 M, Medtech)
- France (\$512 M)** Diabeloop (\$70 M, Digital health)
Wandercraft (\$45 M, Medtech)
- Germany (\$252 M)** Tubulis (\$60 M, Biotech)
Ada Health (\$30 M, Digital health)
- Spain (\$173 M) Catalonia (\$86 M)**
- Italy (\$119 M)** Medical Microinstruments (\$75 M, Medtech)
Empatica (\$34 M, Digital health)

Investment raised by deeptech companies among countries comparable with Catalonia (\$M) (2018-2022)



(*) Dealroom considers *DeepTech* companies to be those that “use cutting-edge technologies to solve complex problems. Artificial intelligence, robotics, computer vision, speech recognition or virtual and augmented reality are just some examples”
Source: Dealroom, December 2022. *DeepTech* rounds amounting to over \$30 M are particularly noteworthy

3

Science and technology assets

Photograph: Germans Trias i Pujol Research Institute (IGTP)



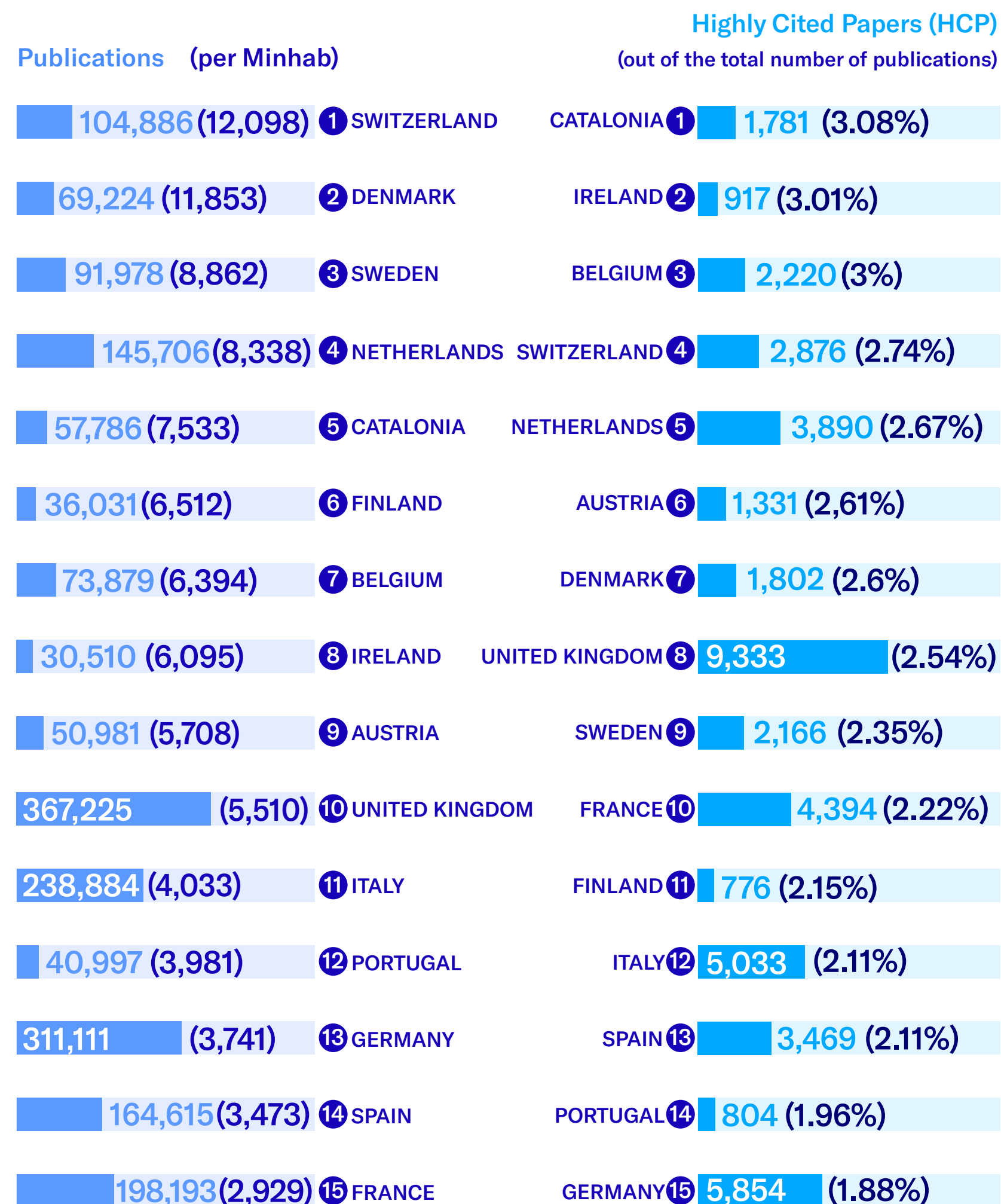
Catalonia, in the European top 5 in scientific publications and competitive European funding

This 2022 Report follows on from the analysis published in 2020 regarding two key indicators of the research quality and the relevance of Catalonia in the field of life sciences and healthcare: the scientific publications and the attraction of competitive European funding. The study was updated in terms of the period and the number of countries to give a fuller vision of the position of Catalonia in Europe.

As can be seen in the illustration, Catalonia stands (per million inhabitants) fifth in terms of number of publications and first in *Highly Cited Papers*, at comparable levels with countries such as Sweden, Belgium, the Netherlands, and Denmark, depending on the indicator.

Catalonia also leads in attracting competitive European funding H2020, which has allowed for over +€570 M to be raised for biomedical projects. Along these lines, the ERC (*European Research Council*) grants awarded to the most promising and competitive, where Catalonia comes fifth (per million inhabitants) with 85 research grants, 26 of which are *Proof of Concept*, i.e. the type recognising the transfer capacity of knowledge generated.

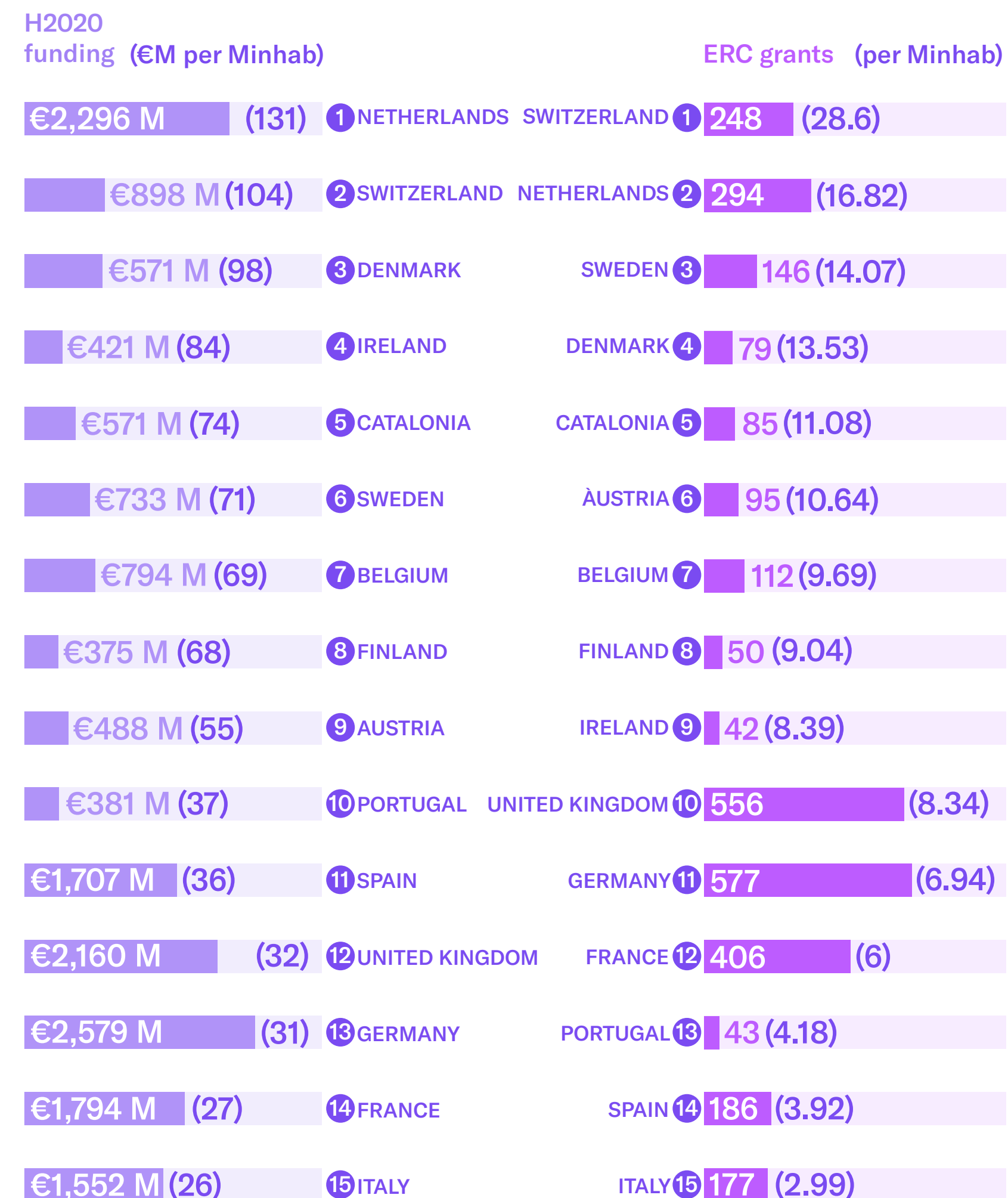
Scientific publications in life sciences and healthcare and funding for Horizon 2020 projects (2016-2021)



Source: Science Citation Index Expanded (WoS) (July 2022).

Publications: Articles, Reviews, Proceedings Papers (2016-2021).

HCP (Highly Cited Papers): Articles and reviews among the 1% most cited in their subject-matter and year of publication.



Source: Horizon Dashboard (July 2022).

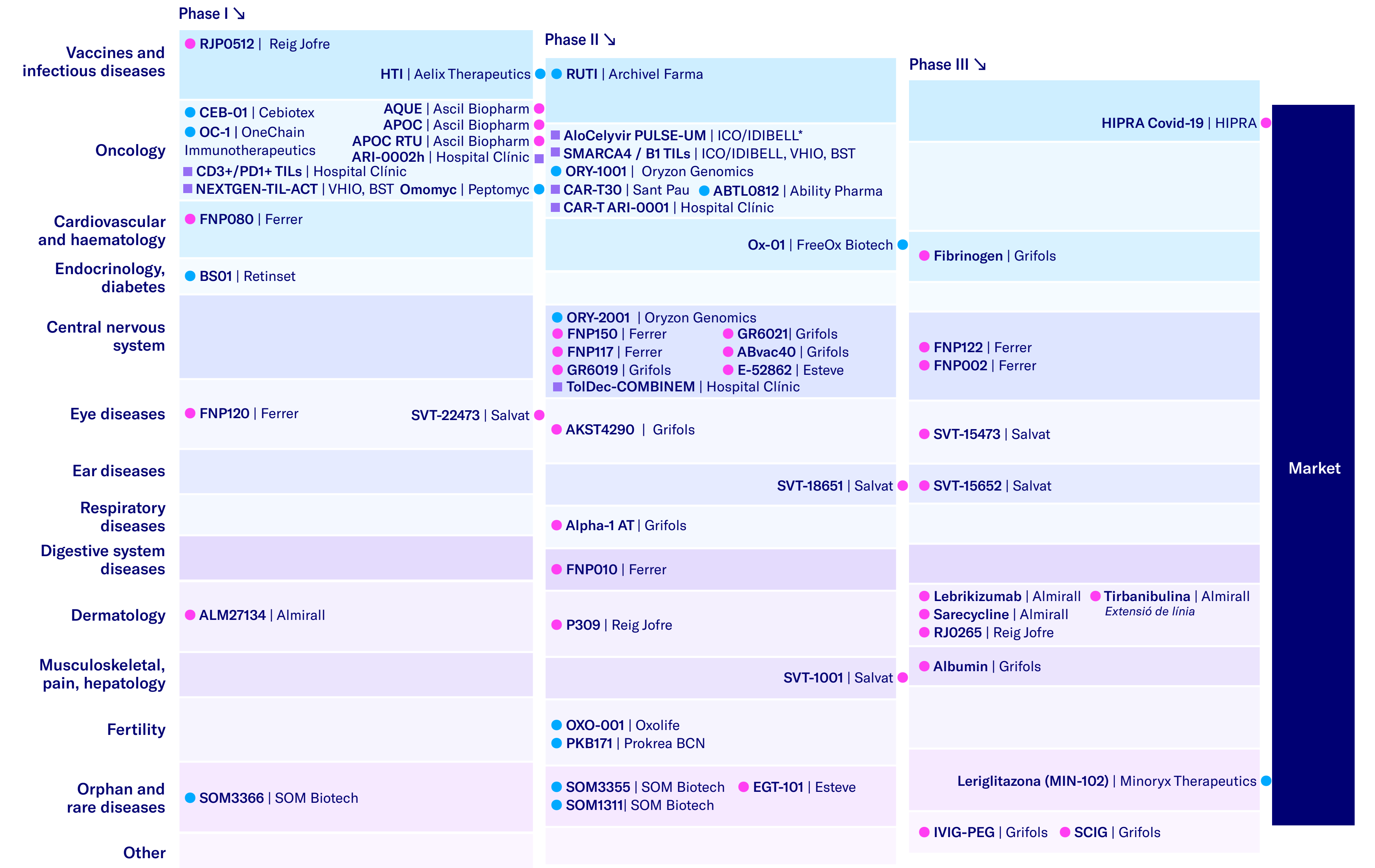
Horizon 2020 (coordinated and participated) projects signed during the 2016-2021 period with EuroSciVoc codes (Medical & Health Sciences; Biological Sciences; Medical engineering) and subject-based priorities (Biotechnology; Health, Health, demographic change and wellbeing).

An increase in the clinical pipeline and licences

This funnel view of the 58 therapies under clinical development in Catalonia in 2022 shows that oncology and neurology head the R&D of biotech and pharma companies, followed by infectious diseases, rare diseases, eye diseases, and fertility. In terms of molecule licences, the €258 M agreement between Minoryx and the Neuraxpharm Group for exclusivity rights in Europe for its lead candidate, leriglitazone (X-ALD) (currently under EMA review) and the operations by Accure Therapeutics (which licensed the development and marketing rights of ACT-01 to the Swiss Oculis) and VCN Biosciences (which licensed the molecule VCN-01 to the US Theriva Biologics) must be noted. In terms of vaccines, special mention must be made of HIPRA, which is awaiting EMA approval for the first future SARS-COV-2 vaccine in Spain.

With regard to advanced therapies, we have identified over 20 non-industrial production treatments under development in the hospitals and healthcare research institutes of Catalonia. The 2022 pipeline shows the trials underway at Hospital Clínic, Sant Pau, ICO-IDIBELL, VHIO and BST, which are already working on other experimental therapies that will enter the clinical phase in the coming year. OneChain Immunotherapeutics has also started a unique clinical trial in the world using CAR-T technology for patients with a subtype of T-cell leukaemia.

Clinical pipeline of Catalonia 2022



Note: The molecules at the intersection between phases have completed the previous phase or are progressing to the next phase.

* Hospital Niño Jesus de Madrid
Source: Biocat

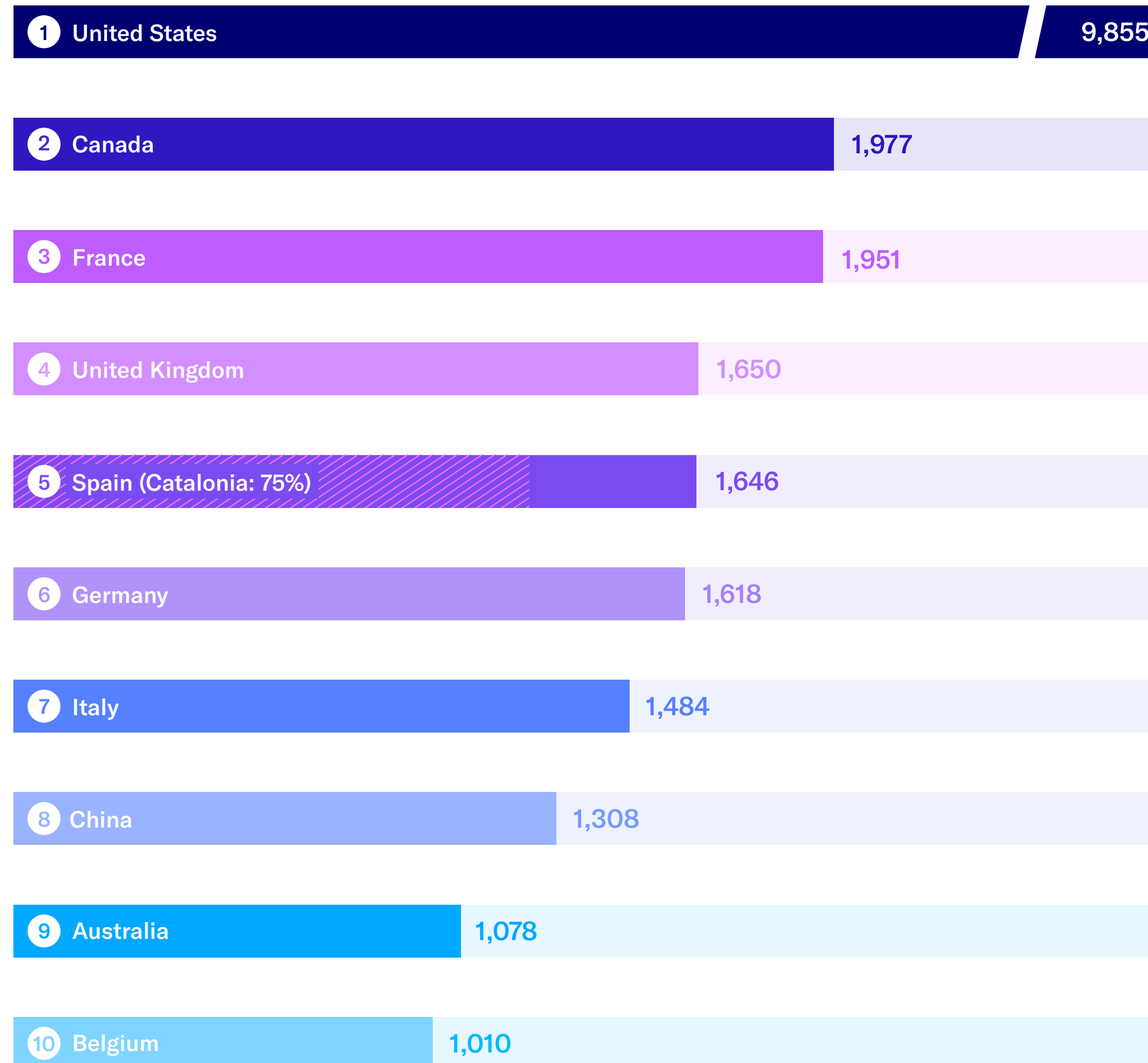
Market

Catalonia, European and world leader in clinical trials

Catalonia has become a top destination worldwide and in Europe for the development of clinical trials. With 1,242 clinical trials currently underway, it stands ninth in the world and sixth in Europe, with almost 50% of trials involving oncology, followed by cardiovascular diseases, ophthalmology, central nervous system, and mental health.

The quality of the health system, the excellence of the hospitals, and the international recognition of the healthcare professionals attract multinationals such as Novartis, Roche, MSD, AstraZeneca, Janssen, GSK and Amgen to Catalonia to develop their trials.

WORLD TOP 10 Number of active clinical trials (2022)



Source: Clinicaltrials.gov

Clinical area	Active clinical trials	European Ranking	World ranking
Oncology	606	#4	#6
Cardiovascular	183	#8	#11
Ophthalmology	101	#6	#9
Central Nervous System	99	#6	#8
Mental health	73	#6	#8
Rare diseases	14	#7	#10

Pharma multinationals developing clinical trials in Catalonia (classified by number of trials)



Source: UNEIX

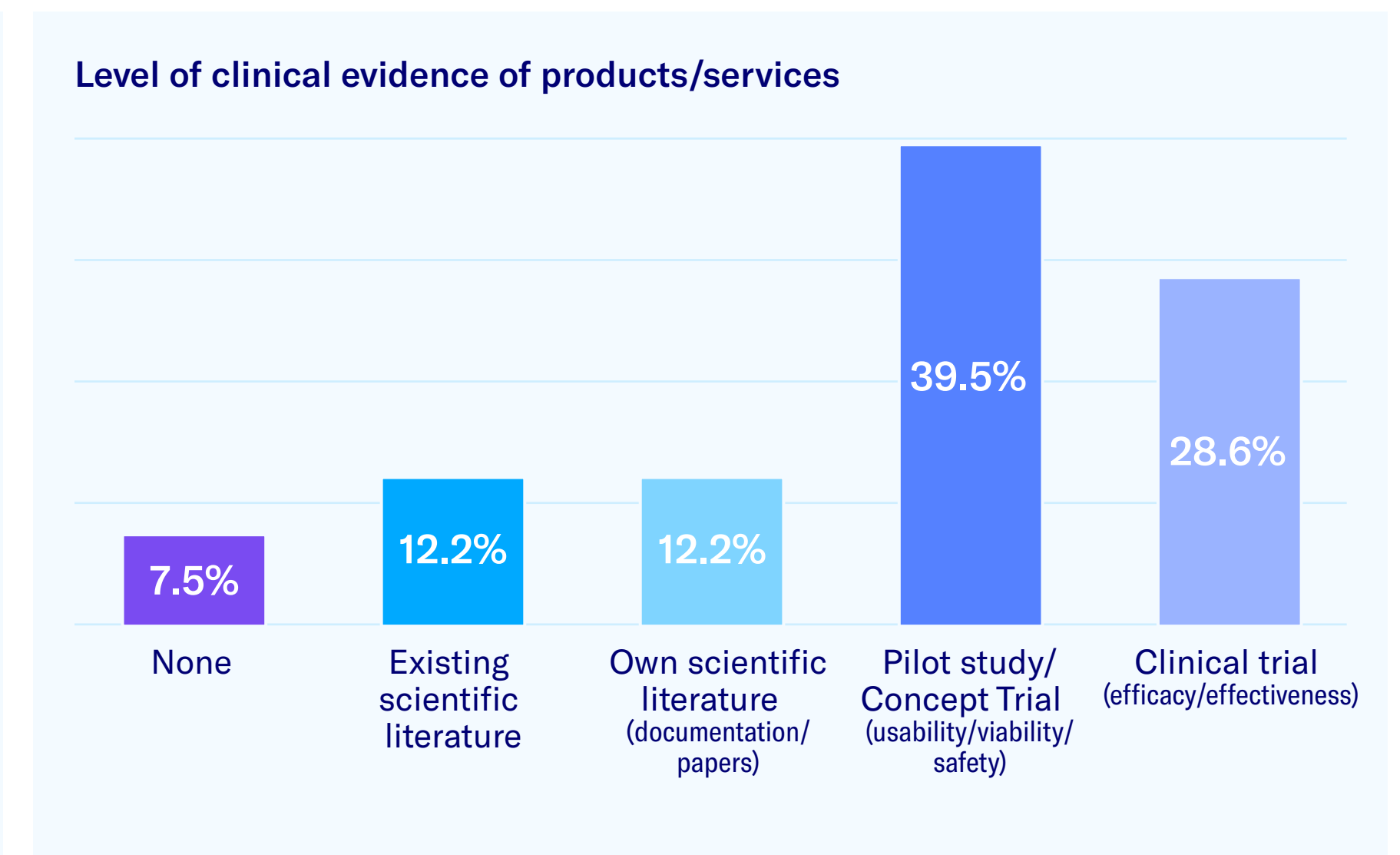
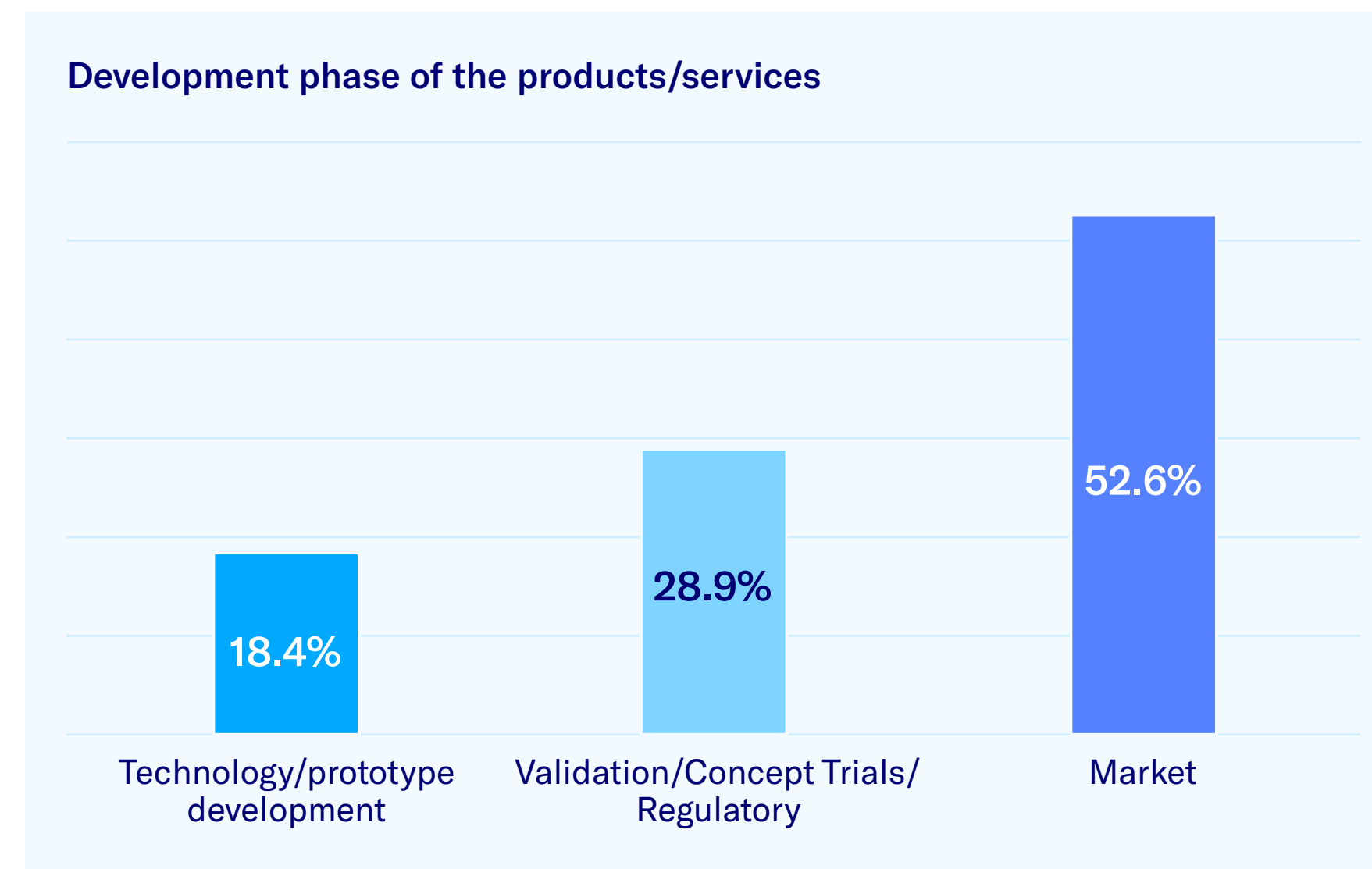
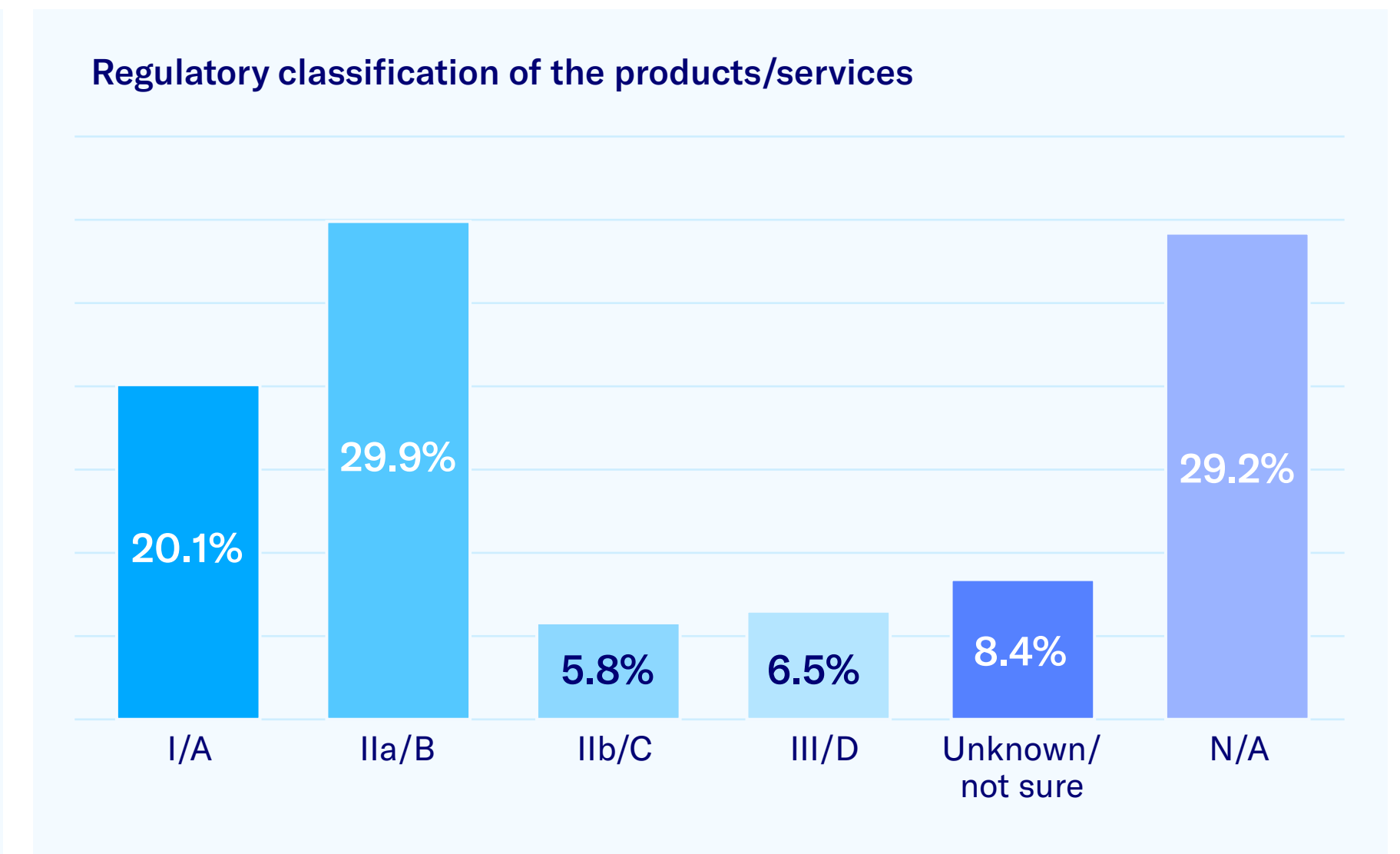
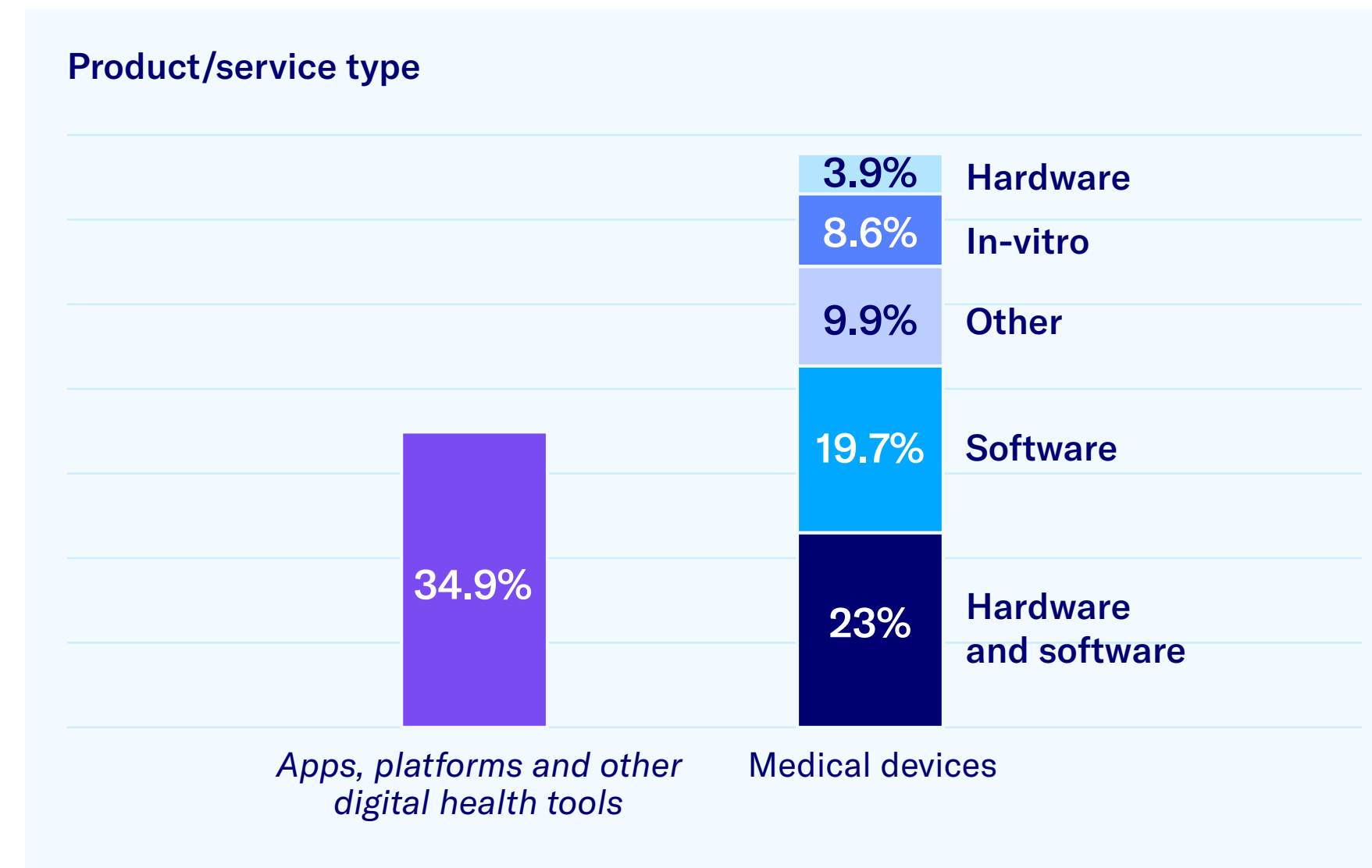
An approach to the healthtech pipeline in Catalonia (I)

For the first time in this Report, and considering the relevance of the digital segment in the sector as a whole, we have introduced a vision* of the products and services offered by *healthtech* companies in Catalonia in 2022, which we hope to expand upon in future editions.

In terms of the type of product developed, **medical devices (65%) stand ahead of apps, platforms and other digital health tools**. Almost half is in the development, validation or PoC phase or is awaiting regulatory approval, and 52% is in the marketplace (mostly *apps*, which require no regulatory approval). A large part of the products (almost 50%) are classified with a low risk level (I/A and IIa/B) or have no risk level at all (*apps*). To show the level of clinical evidence, a significant number of companies are developing pilot studies (almost 40%) and are in clinical studies (close to 29%).

*Consultation to 311 healthtech companies in Catalonia in 2022, with 27% responses obtained.

Type and classification of *healthtech* products and services



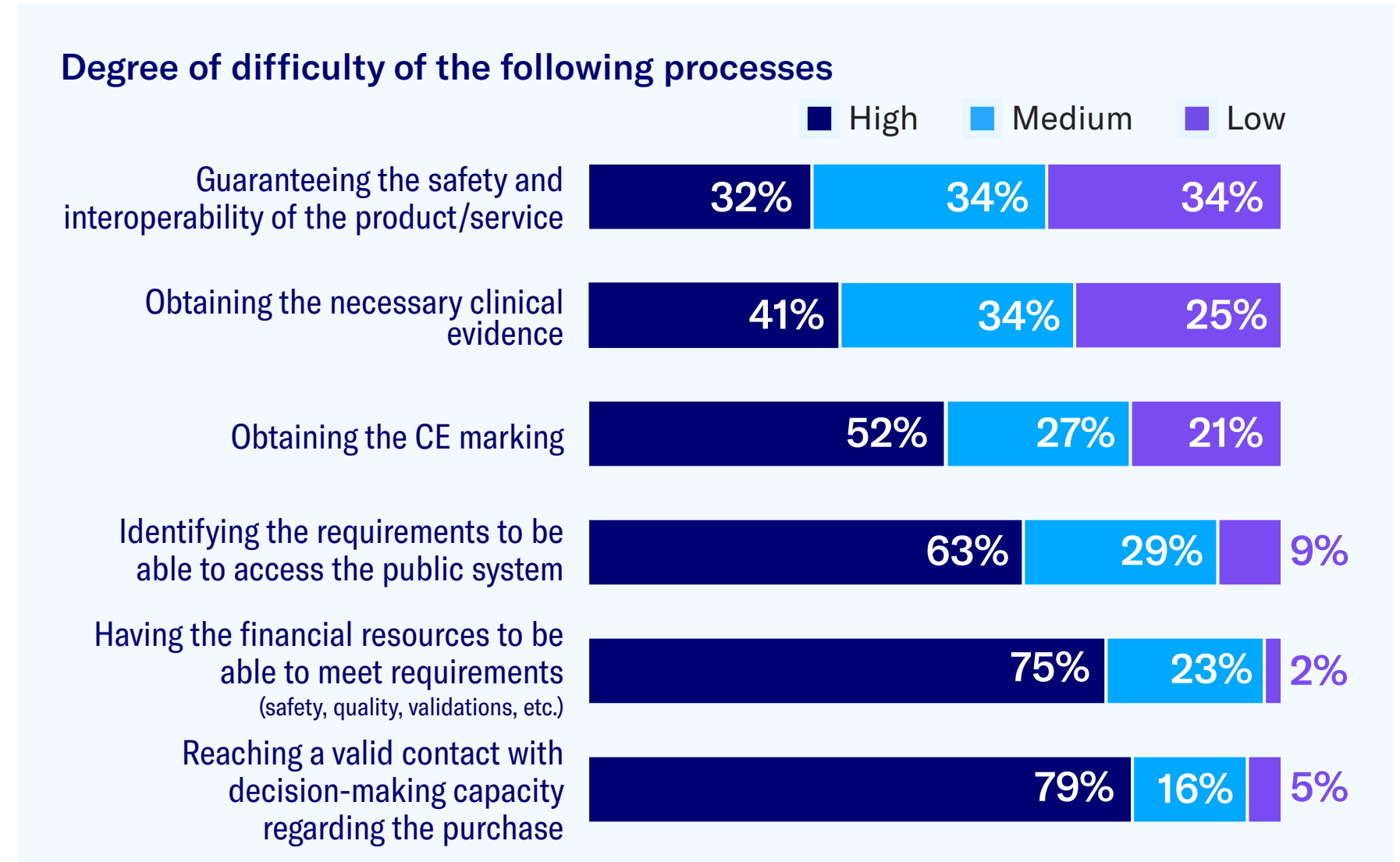
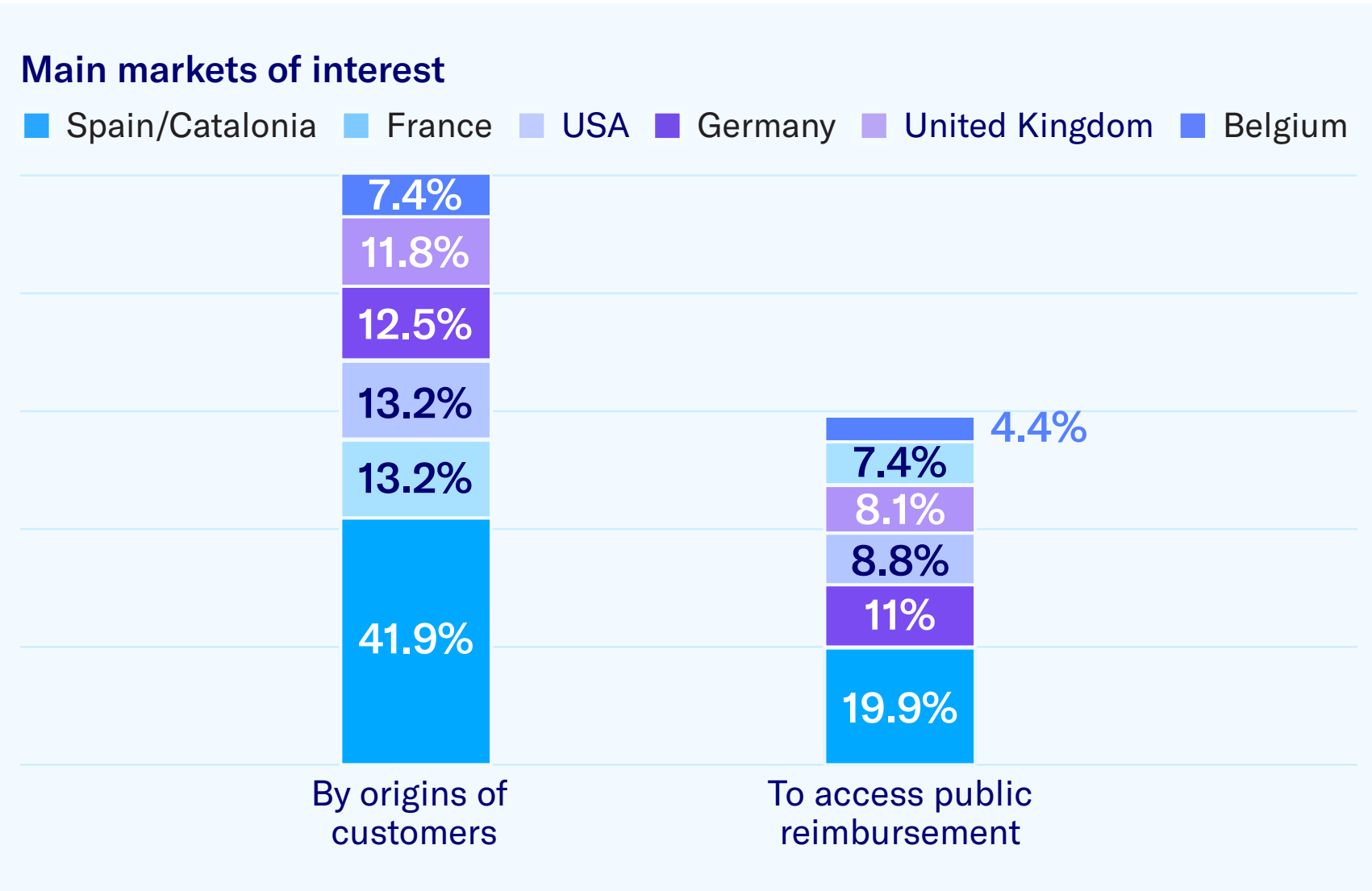
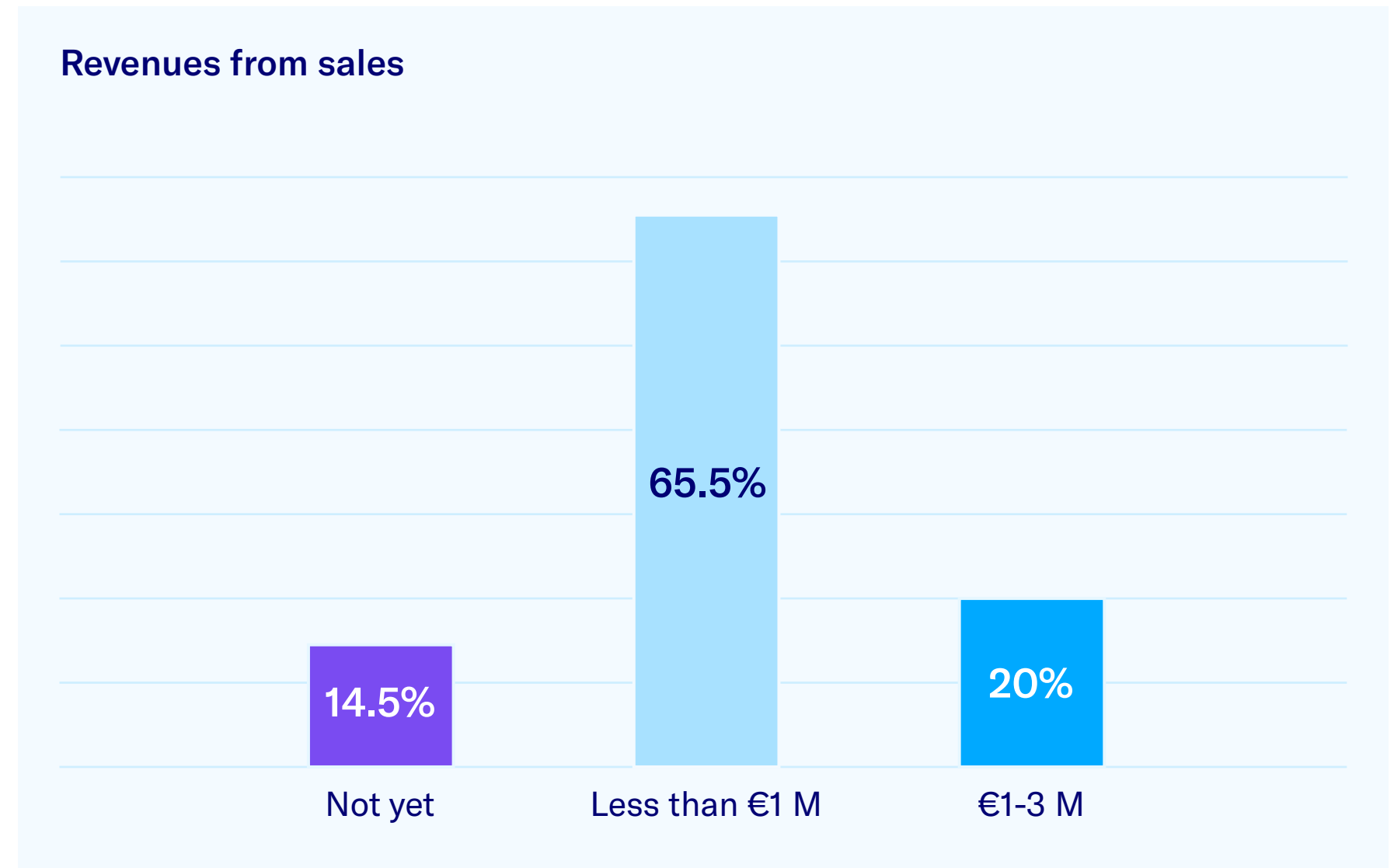
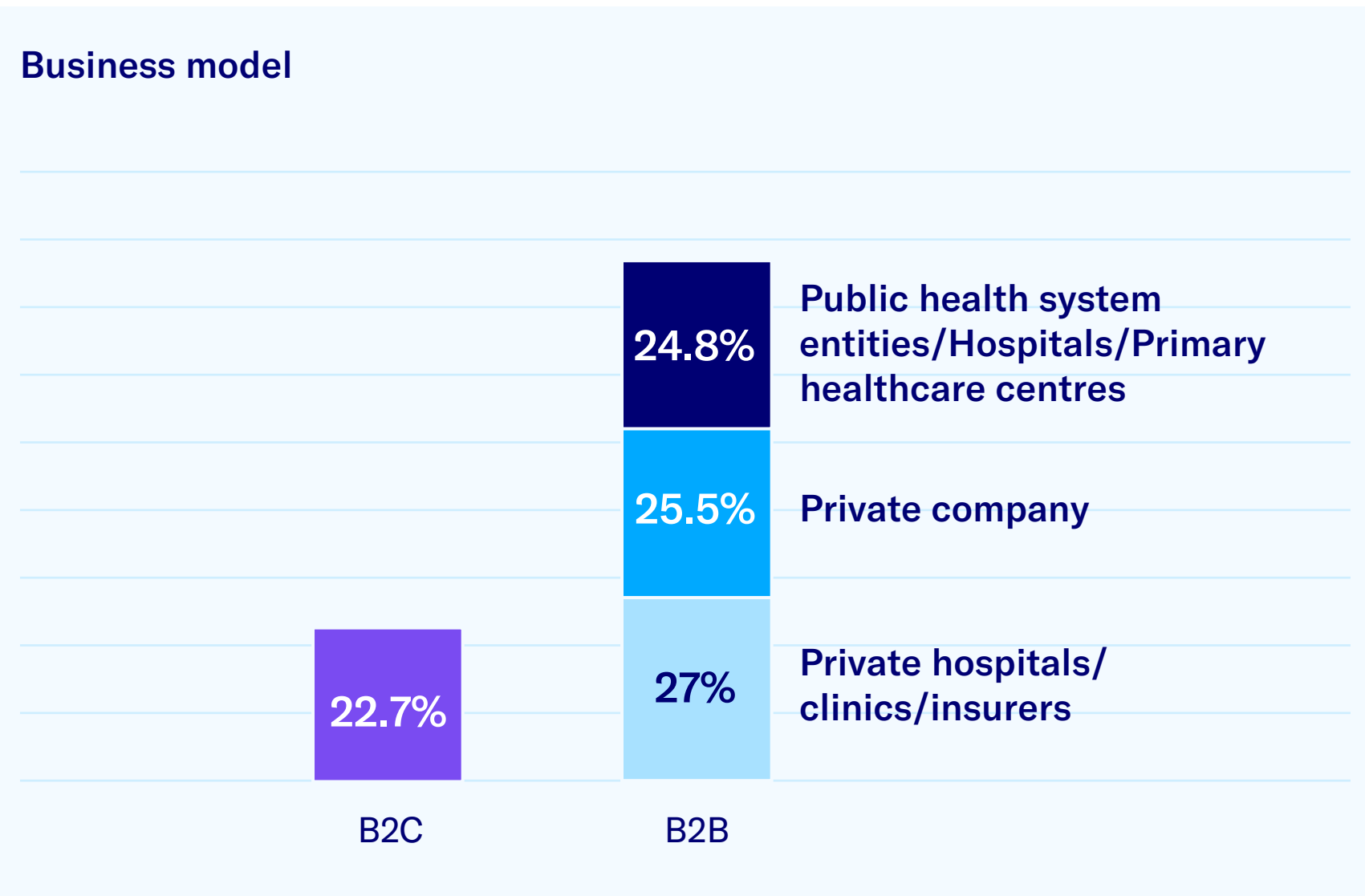
An approach to the healthtech pipeline in Catalonia (II)

Having analysed the characteristics of the *healthtech* products and services from the BioRegion, we will now discuss the business dynamics. It can be seen here that most (80%) are B2B companies, i.e. they are solutions in which the client or the payer is an organisation (health system or public hospital) or a company (private hospital, insurer or company). Most companies (65.5%) have a turnover of less than €1 M, and only 20% have a turnover of between €1 M and a maximum of €3 M. Insofar as markets, close to 60% have clients in the United States, France, Germany or the United Kingdom.

The consultation made has enabled us to identify a series of challenges faced by these companies in their business development, such as:

- Reaching a valid contact with decision-making capacity regarding the purchase
- Having the financial resources to be able to meet safety, quality, clinical validation requirements, etc.
- Identifying the requirements to access the public system
- Obtaining the CE marking

Business development in *healthtech*



Transfer of research centres in spinoffs

The international competitiveness of research centres is recognised as one of the main assets of the BioRegion. However, the transfer of results from research to the market remains one of the major challenges of the ecosystem.

The attached graph shows an analysis based on the budget per researcher in each research centre and the number of companies (spinoffs) that the centres generate, including the investment volume that these spinoffs raise. These indicators, along with the licensing agreements and patents transferred (information not included in the illustration due to a lack of quality data) will provide a more complete view of the transfer capacity of the centres, which we expect to be able to build upon in future editions of the Report.

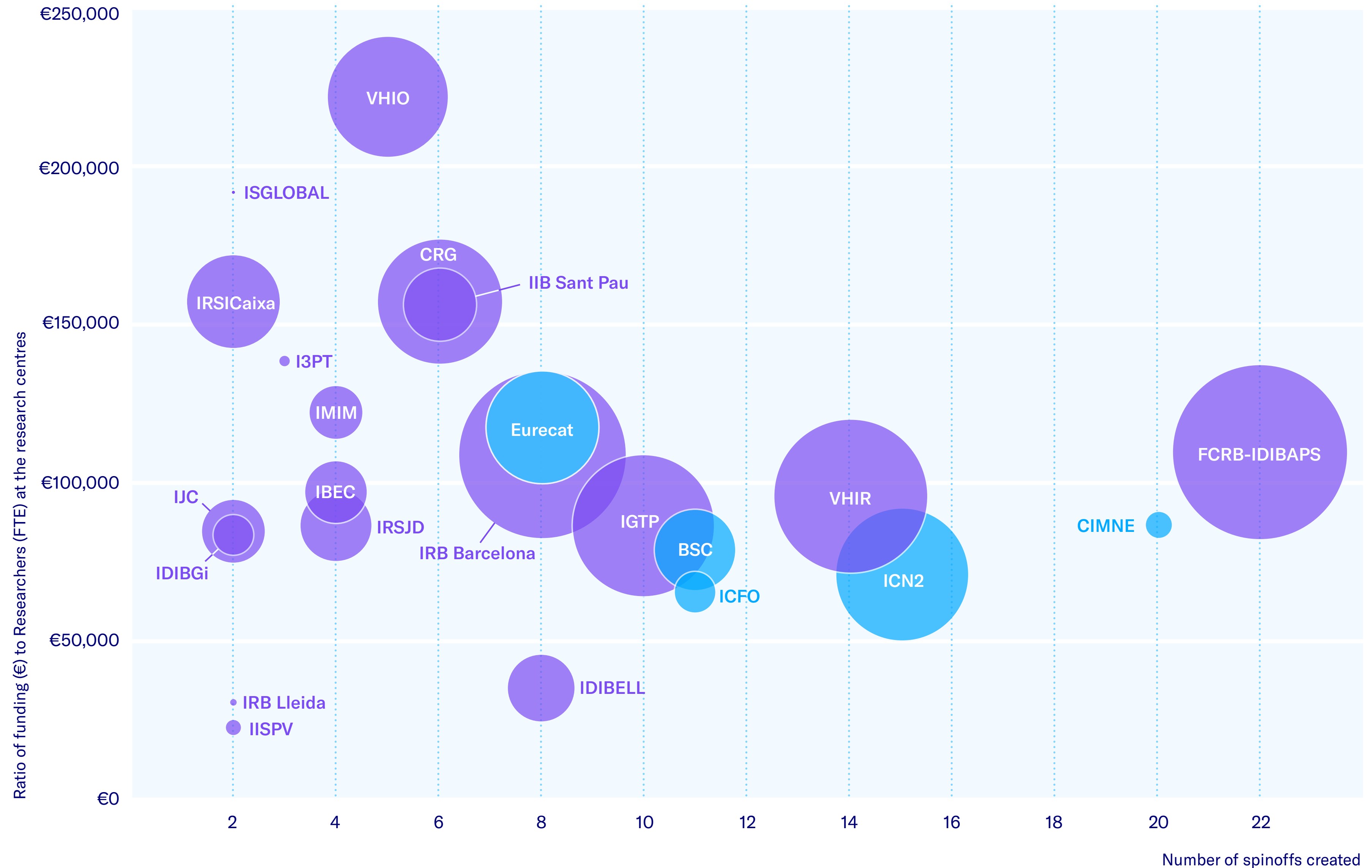
Although the illustration can be interpreted in many different ways, it can be seen that organisations with a similar budget-to-researcher ratio generate a different number of spinoffs, and centres generating the same number of spinoffs have significant differences in ratio. In terms of investment, a significant amount of variability is observed between the volume of investment attracted in the different centres.

The fields of research and strategic priorities of each centre contribute to the position of each entity in the graph.

Note: The graph includes CERCA centres, the BSC, and Eurecat. See additional information and abbreviations of the institutions in Methodology.

Transfer of research centres in number of spinoffs

● Centre from the health sector ● Multi-sector centre ○ Investment attracted by spinoffs*



*The size of the organisations represented ○ indicates the investment attracted by their spinoffs (between <€500,000 and €66 M).

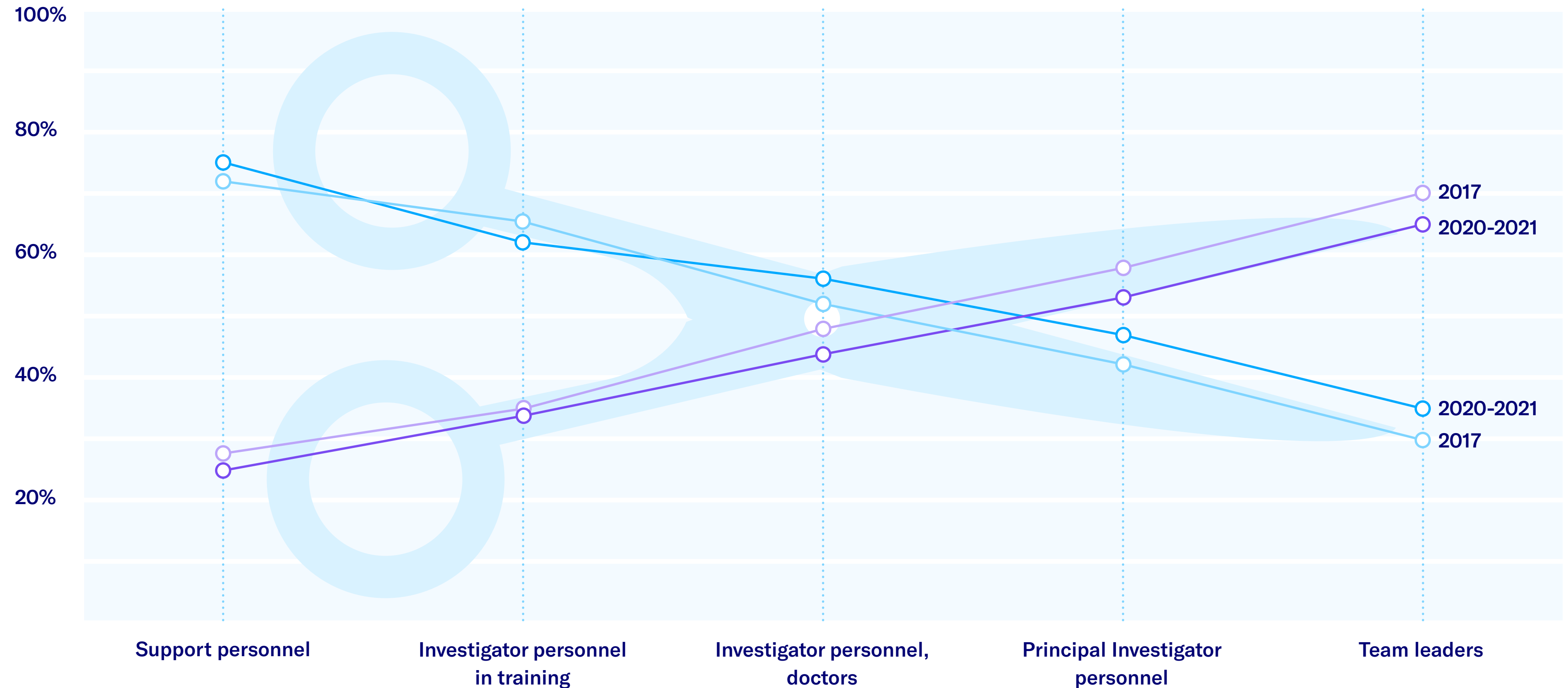
Gender inequality in the sector in figures

The **gender gap** is a complex phenomenon that we have wanted to discuss in this Report, offering an overall approach from the research to the company. Starting with universities, STEMs are degrees with fewer female students in the classrooms, a problem that affects a **minority of women in scientific infrastructures**.

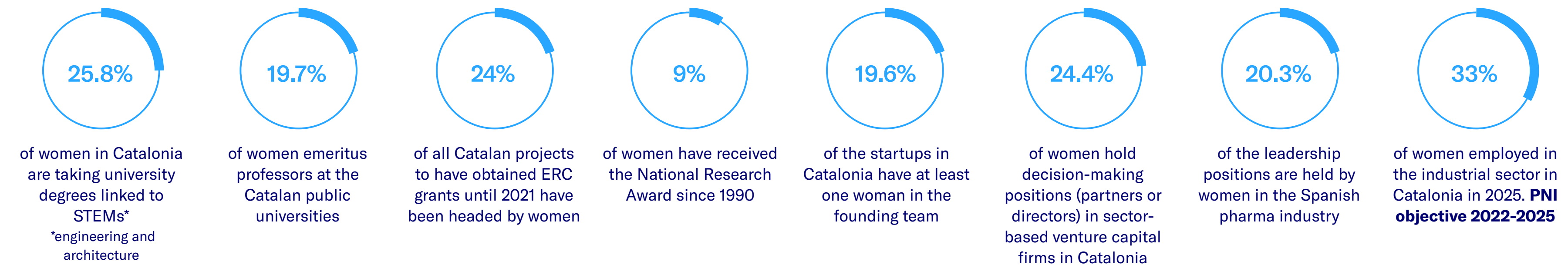
In terms of research, the difficulty comes up against a **lack of equality as the researcher career progresses**, which has an impact on a masculinised professional structure in Catalan research centres and universities, **difficulties in obtaining prestigious resources**, and a **lack of knowledge**.

In entrepreneurship, women form part of the founding or management team in almost 20% of all Catalan startups, a figure that, despite being low, is above the European average (17%). Apart from this, the **lack of women in leadership positions in specialised investment funds (24.4%)** has become a challenge for obtaining funding. In business, women account for over 53% in the pharma industry. What is more, **only 20.3% of the management positions are held by women**, with management support positions being the most predominant.

Gender scissors in health research centres in Catalonia



Source: AQUAS, Central de Resultats dels Centres i Instituts de Recerca en Salut, based on SIRECS-UNEIX data (2017-2021)



Source: La bretxa de gènere al sector de ciències de la vida i la salut Report. Department of Equality and Feminism, Biocat, 2022

10 gender recommendations for the life sciences and healthcare sector in Catalonia

Source: *La bretxa de gènere al sector de ciències de la vida i la salut* Report. Department of Equality and Feminism, Biocat, 2022

1. Awareness and elimination of gender bias in education and business ↘

Urging the Authorities, business associations, professional education centres and social agents to:

- Provide education on the gender perspective at primary education and school levels, make female leaders visible, and launch calls for projects to identify gender bias.
- Ongoing training for the public and private sector on the gender perspective, with associated certificates and benefits.
- Encourage the generalised and institutionalised use of inclusive language, and review the language and descriptions used in job offers.

2. Decided action with policies and funding to apply the gender perspective to all public and private spheres ↘

Urging the Authorities, institutions and decision-making agents to:

- Strengthen the gender perspective in the Government's plan, with a schedule, funding and financial prioritisation, assigning entries for this in all departments of the Generalitat.
- Introduce incentives for companies to ensure gender equality throughout their organisational chart, with special emphasis on leadership and with possible penalties for non-compliance.
- Review criteria to encourage the participation of women in the public realm in decision-making positions.

3. Encouraging the presence of girls in STEM ↘

With the Departments of Education, Research and Universities, with the support of professional associations, the media, communicators, and opinion leaders:

- Strengthen the training and education of new generations in equality with workshops, conferences and congresses to arouse girls' curiosity for STEMs
- Not start a workshop or an activity in educational circles if it does not have a minimum percentage of girls.
- Encourage access to equal technical training and review the equality factors in current regulated training courses.

4. Removing the glass ceiling and reducing the gender scissors in academic and research circles ↘

Urging the Authorities, universities and centres, the governing bodies of institutions, and the research teams themselves to:

- Review the assessment of skills and achievements, review titles and apply weightings if necessary to strengthen the gender perspective.
- Implement positive discrimination quotas and mechanisms in the calls for competitive funding.
- Encourage the implementation of effective equality plans, with follow-up measures in all institutions and by internal and governing bodies.

5. Promote the role of women in future technological environments ↘

Urging the Public Authorities, companies, and institutions to:

- Introduce corporate and administrative incentives (e.g. accreditations) for the incorporation and promotion of women in deeptech companies.
- Encourage the presence and voice of women in forums, meetings, courses, panels, etc. where technological and industrial issues are discussed.
- Ensure the events organised by public institutions cannot be held if equality between the people taking part is not respected, and encouraging public figures to refuse to take part in any private event that does not respect equality.

10 gender recommendations for the life sciences and healthcare sector in Catalonia

Source: *La bretxa de gènere al sector de ciències de la vida i la salut* Report. Department of Equality and Feminism, Biocat, 2022

6. More women in management and in decisive positions in industry ↘

Involving the Public Authorities, companies, professional networks, and professional associations in:

- Encouraging the professional networks of women, female mentoring, and corporate volunteers and making them more visible within companies
- Selecting more women from independent groups of experts for the boards of directors of startups
- Encourage internal mechanisms to identify and draw attention to situations of discrimination or a lack of equality, with an impact on the incentives and opportunities received by the company.

7. More startups by women growing and moving up ↘

With the Public Authorities, companies, professional networks, professional associations, event organisers, and investment funds:

- Encourage the presence of women on decision-making committees, raising awareness of their role as an example.
- Promote incentives and benefits for Women Ventures and specialised venture capital headed by women and with a focus on gender or femtech.
- Design specific instruments such as Women Fast track by the Authorities to support the creation and consolidation of startups headed by women.

8. Greater transparency in the gender perspective in companies, from startups to SMEs ↘

Involve the Public Authorities, companies, business associations, employers, and unions in:

- Implementing gender quotas for all selection processes. Stop and review the processes if the quota is not met.
- Actively ensure the wage balance and be transparent in its implementation.
- Review company policies regarding the work-life balance; protection of the right to maternity leave, and decision-making in family-related and personal projects. Train in physical and psychosocial risk prevention with a gender perspective.

9. Monitoring compliance with measures in the public and private sector by the government ↘

Urging the Authorities, institutions and decision-making agents to:

- Create a committee with social agents to analyse the barriers and raise awareness of the progress made in this area
- Equip gender observatories to monitor and ensure compliance with gender policies.
- Promote mechanisms in the public sector to monitor and correct the pay gap for jobs and similar responsibilities, using public funds to make non-discrimination an example to follow for the private sector; promote a surveillance framework in agreement with all business agents.

10. Reward the gender perspective throughout the value chain ↘

With the Authorities, institutions and decision-making agents:

- Encouraging the application of quotas and raising awareness of good practices in centres and companies, with models of success and awards/accreditations from the Generalitat and other authorities to companies that promote female leadership with fair and equal processes. Implementing monitoring mechanisms and ex-post measures regarding accountability.
- Promoting financial credit with a gender perspective (considering obstacles and difficulties that women may encounter) and tax benefits for appointing women at executive levels.
- Creating a hallmark for startups that streamlines their access to specialised funding and investment.

4

Additional insights on business activity



Photograph: 22@Barcelona



Strengthen investment in R&D by the pharma industry and medical technologies

In this chapter, using figures from the business associations Farmaindustria, Fenin and CataloniaBio & HealthTech, we review key indicators in the competitiveness of the industry in Catalonia in its nationwide context.

On one hand, biopharma investment in R&D increased by an estimated 8% in 2021 to stand at almost €372 M, close to 30% of total Spanish investment that reached a record figure of €1,267 M. Of this figure, the 43.5% allocated to research projects with hospitals, universities and healthcare centres (extramural investment) must be highlighted, as it exemplifies the significant public-private collaboration in this area. Also worth noting is the 60% that Catalonia and Spain allocate to clinical R&D, primarily phases I and II, with an increasingly relevant role given to trials involving rare diseases.

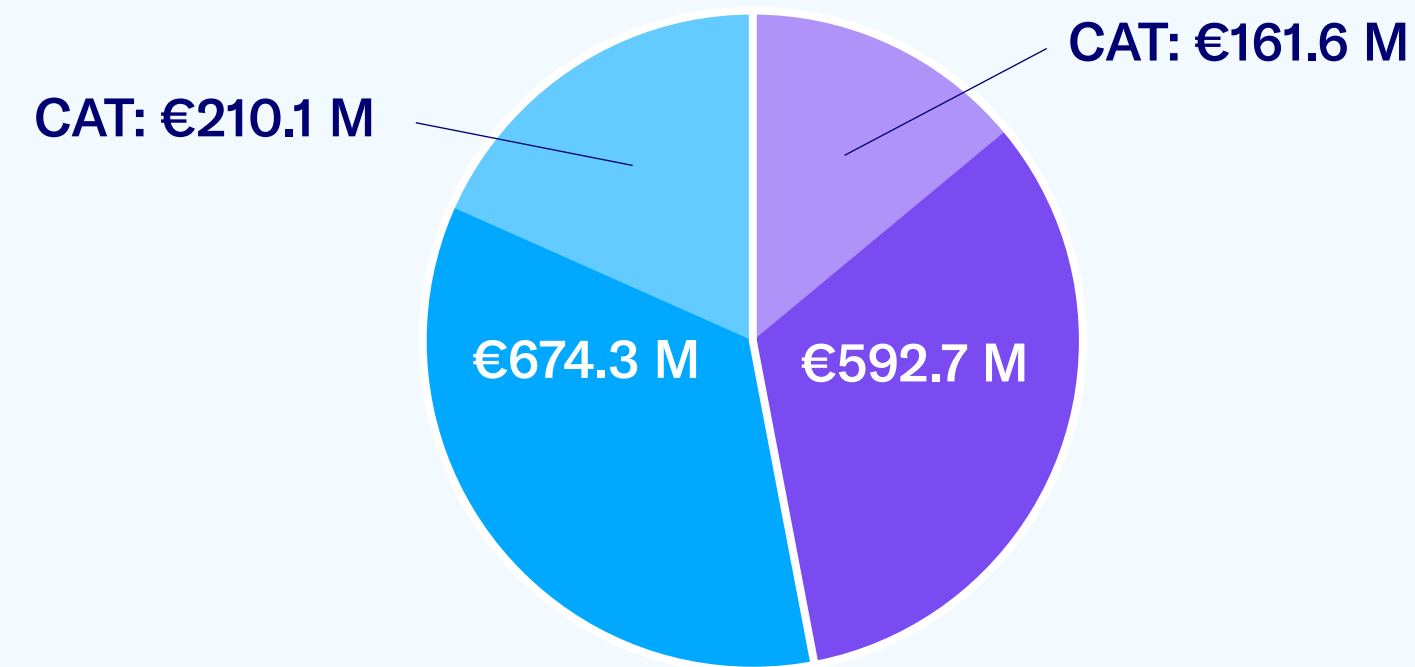
In terms of medical technologies in Catalonia (which accounts for 35% of the Spanish sector), of note is the firm commitment of 70% of companies that indicate they invest in R&D to improve their products and services. More specifically, 53% invest up to 20% in R&D, and 13% between 30% and 60%.

Source: Survey on the pharmaceutical industry *Encuesta de I+D en la industria farmacéutica 2021*. Farmaindustria, diciembre 2022 and *Estudi sobre la fabricació de tecnologia sanitària a Catalunya*. Fenin, 2021

Pharma industry

Investment in R&D in Spain by location (2021)

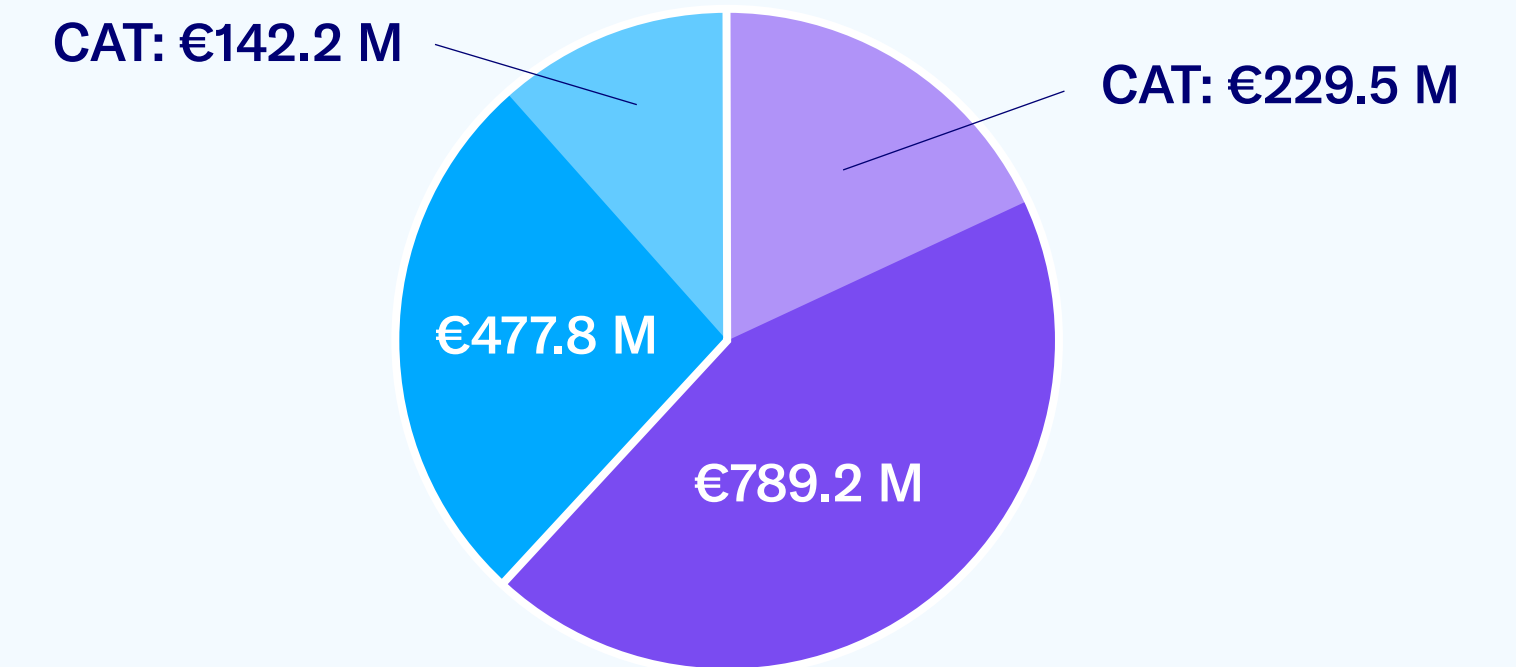
- Intramural investment in R&D (research centres of the same companies)
- Extramural investment in R&D (with hospitals, universities, and public and private centres)



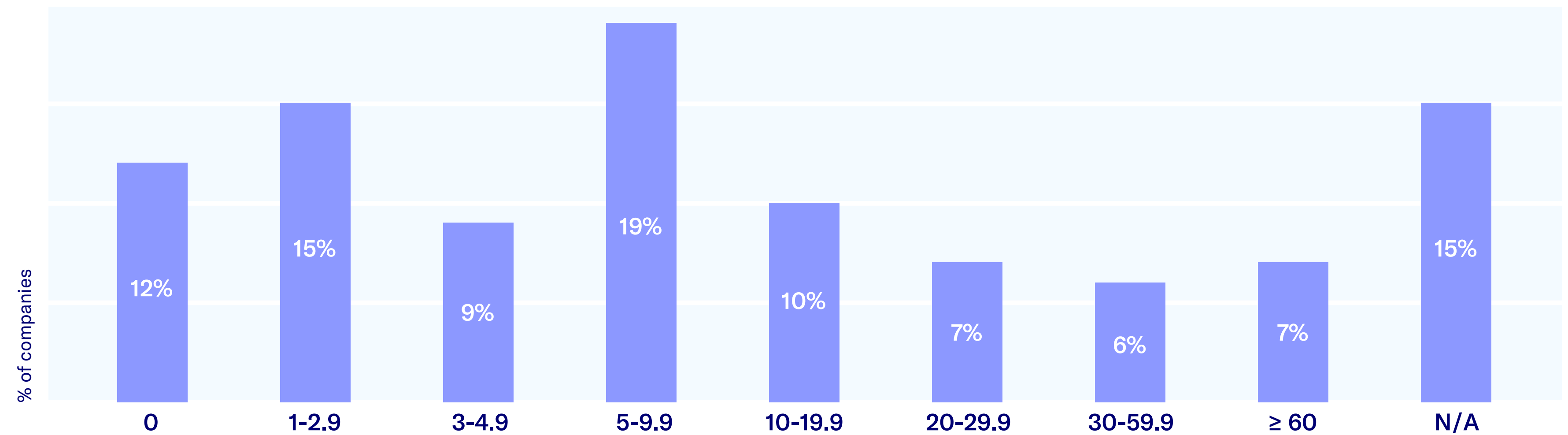
Source: Farmaindustria

Investment in R&D in Spain by research phase (2021)

- Investment in clinical R&D
- Investment in non-clinical R&D (including basic, galenic, and pre-clinical, post-authorisation studies, technological development, etc.)



Health technology manufacturing industry in Catalonia: investment in R&D in relation to turnover (2020)



Source: Fenin

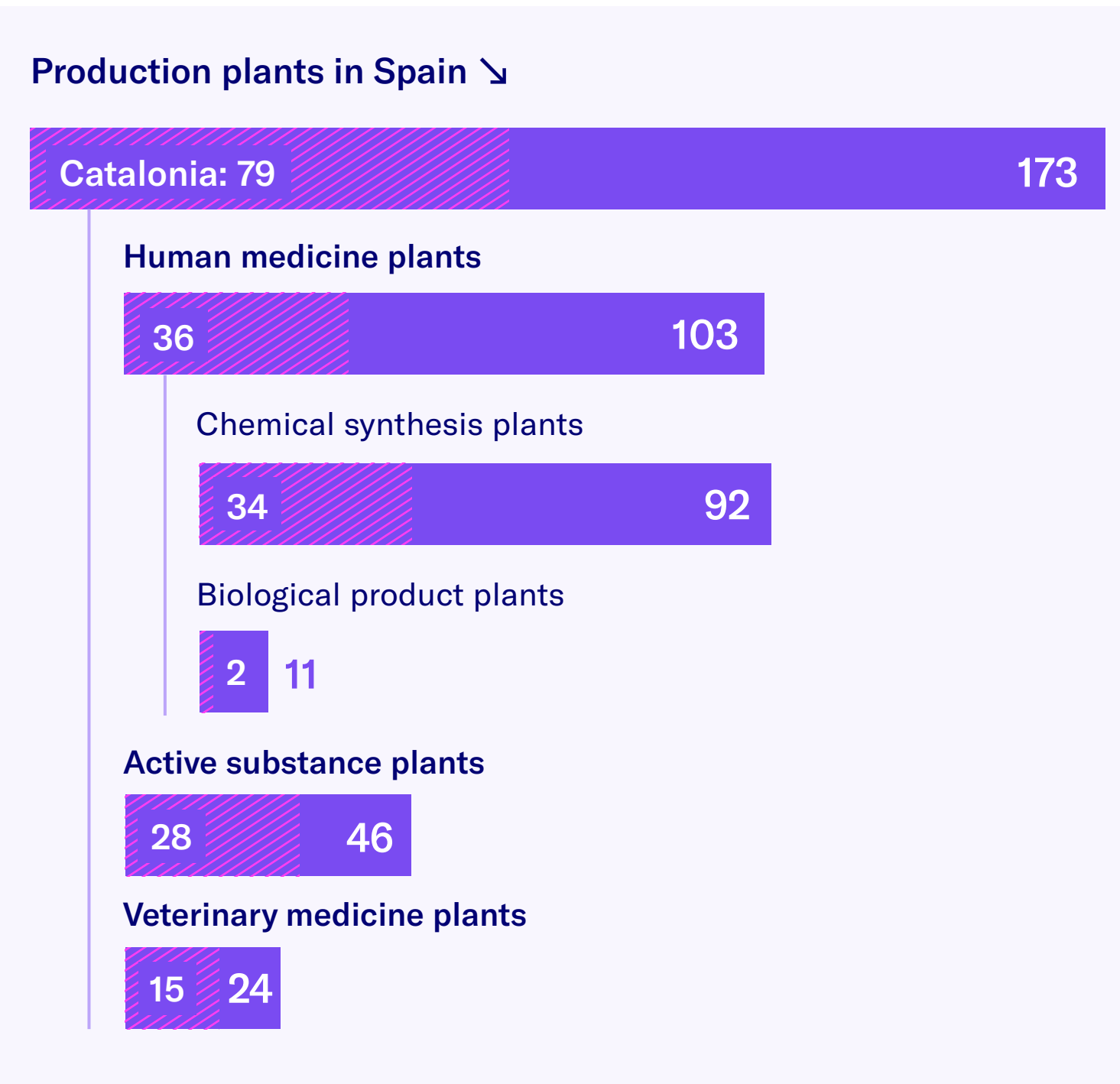
Note: Healthcare technology is considered as all products, devices, equipment, materials, therapies, solutions, clinical analyses and medical and surgical procedures used in healthcare and developed to predict, forecast, prevent, diagnose, treat and monitor or control a disease, a physiological or pathological state, an injury or a disability, and to improve the quality of life of patients.

Catalonia is home to 46% of all medicine production plants in Spain

Spain has some of the greatest pharmaceutical manufacturing potential in Europe thanks to its powerful industrial network of national and multinational companies. It has 173 medicine production plants belonging to 122 business groups, of which 79 (46%) are in Catalonia. Of these 79 plants, 36 produce medicines for human use (34 chemical synthesis, 2 biological medicines), 28 produce drug substances, and 15 produce veterinary medicines.

Catalonia is the industrial workhorse of the sector (46%), followed by Madrid (23%), Castilla y León (8%) and Castilla-La Mancha (5%). Increasing the medicine manufacturing capacity would improve the supply of strategic drugs and the competitiveness of the pharma industry, the strengths of which include high quality standards in factories, competitive costs in relation to other EU countries, skilled personnel, and a high level of investment, among others.

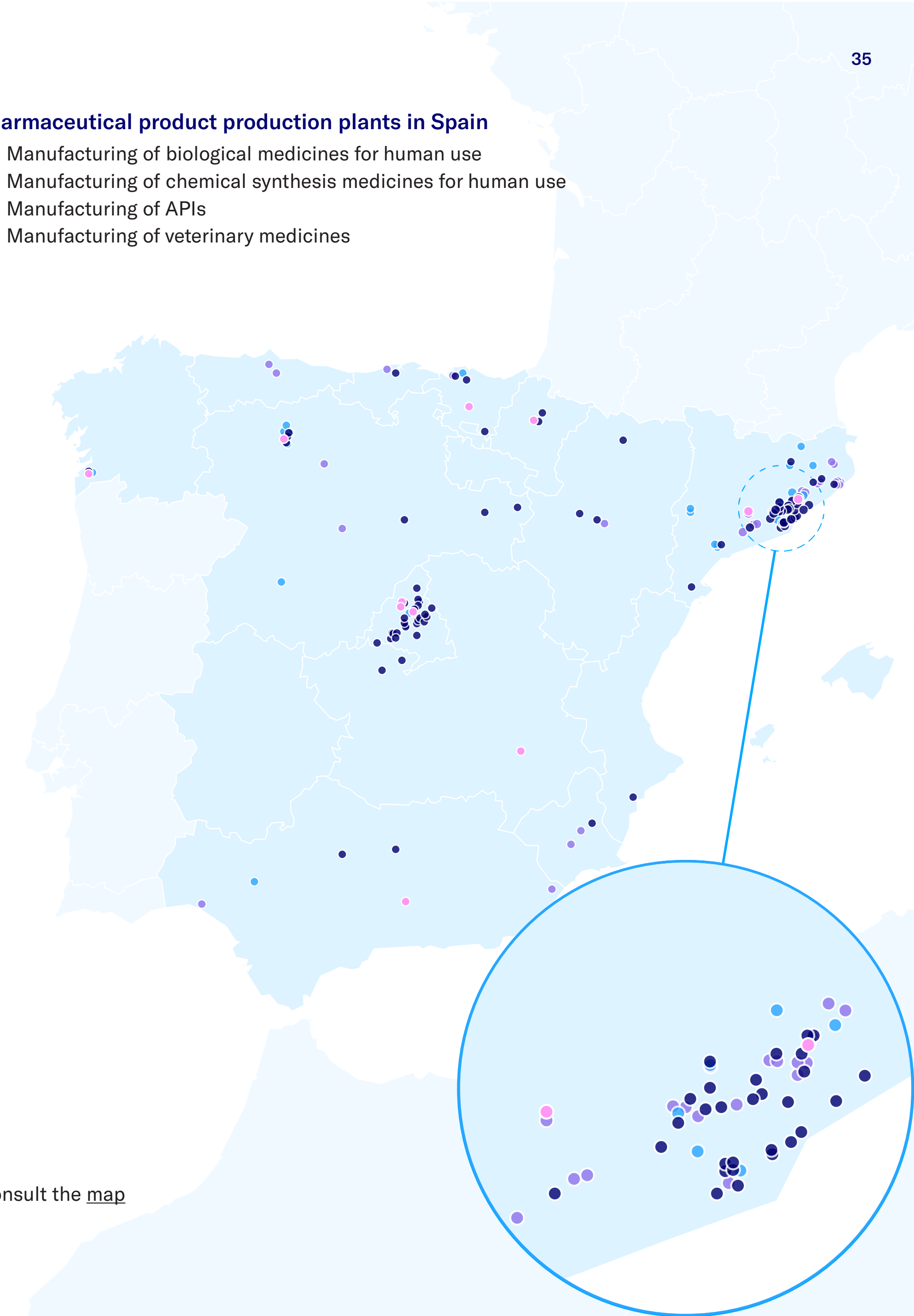
Despite the scarce presence of plants producing biological medicines for human use throughout Spain (only 11, 2 of which are in Catalonia), pharmaceutical multinationals are currently implementing projects to invest in production plants and acquire startups.



Source: Study on the industrial implementation *Estudio sobre la implantación industrial del sector farmacéutico en España*. Farmaindustria, ManageArt. 2022

Pharmaceutical product production plants in Spain

- Manufacturing of biological medicines for human use
- Manufacturing of chemical synthesis medicines for human use
- Manufacturing of APIs
- Manufacturing of veterinary medicines



Consult the [map](#)

Catalonia leads the way in medtech manufacturing and the concentration of medtech companies

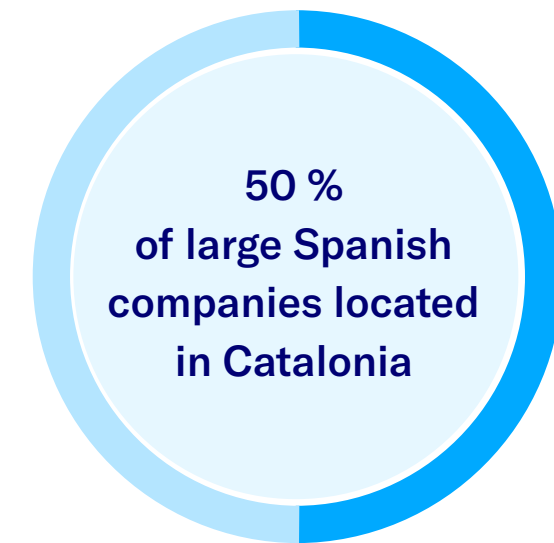
The latest study published in 2022 by Fenin Catalonia provides this snapshot of the industrial network of medical technologies and their internationalisation.

Catalonia is at the forefront of the medtech subsector in Spain in terms of the number of companies (35%), followed by Madrid (21%) and Valencia (16%). 90% (77 companies) manufacture healthcare products and 7% manufacture hospital equipment only. 95% manufacture end products. As can be seen in the illustration, the range of medtech products is extremely wide, and many played a leading role during the pandemic, such as personal protective materials, diagnostic tests, respirators or monitoring equipment, among others.

Most companies are SMEs (around 85%), and 50% of the large Spanish companies have headquarters in Catalonia. 76% of the companies have now implemented the digital transformation phase, and the degree of digitisation is greater in large companies and multinationals.

By type of company, 66% are national manufacturers, 22% are Spanish multinationals, and 9% are multinationals with foreign capital that have production facilities in Catalonia. 24% of companies produce outside Spain.

Concentration of industry ↘



Type of company ↘

Other	2%
Non-Spanish multinational producing in Spain	9%
Spanish multinational	22%
National manufacturer (not producing abroad)	66%

Main production sectors ↘



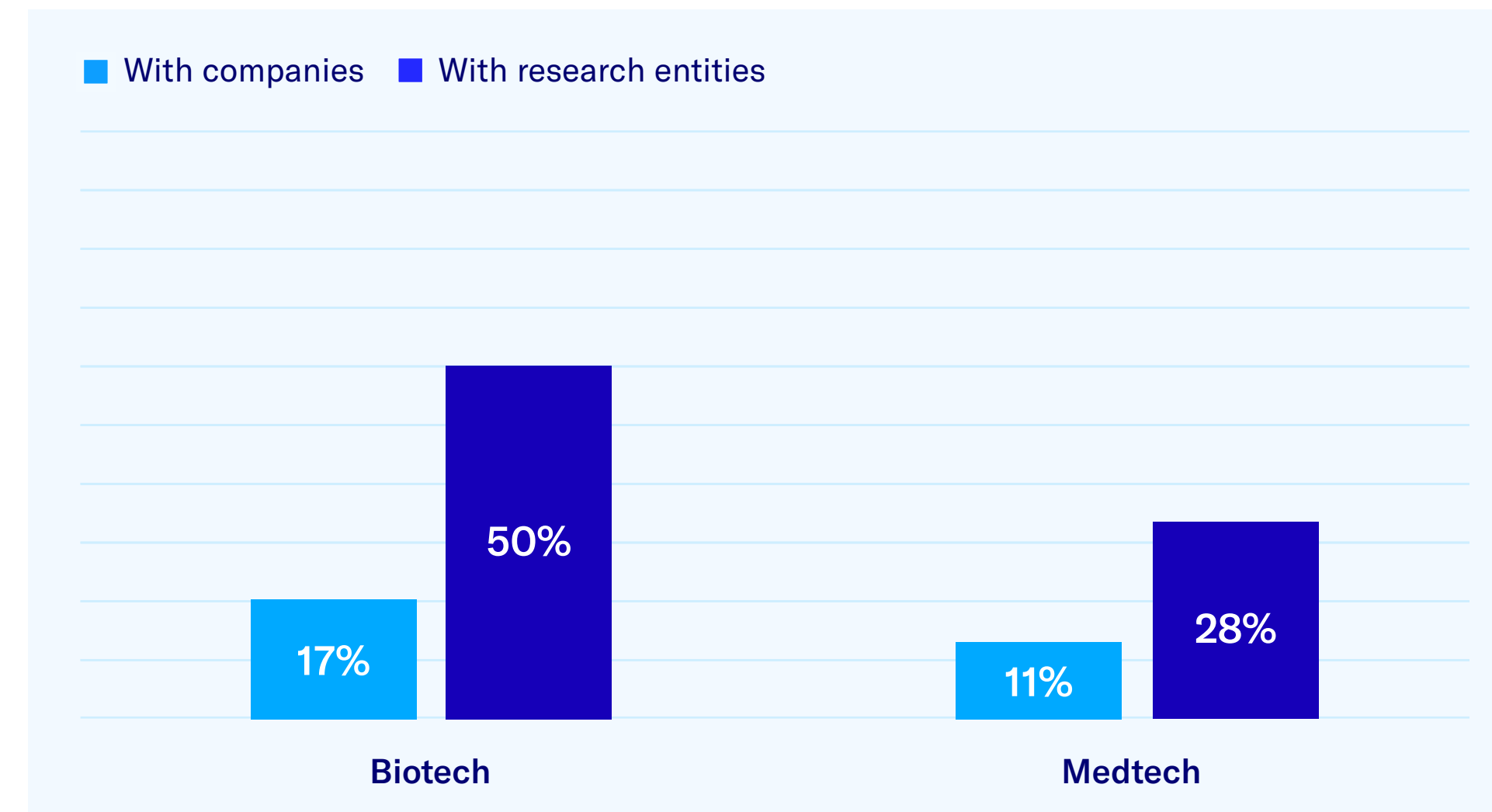
Source: Study on the manufacturing of healthcare technology *Estudi sobre la Fabricació de Tecnologia Sanitària a Catalunya*. Fenin, 2022

Collaboration and R&D agreements in the industry

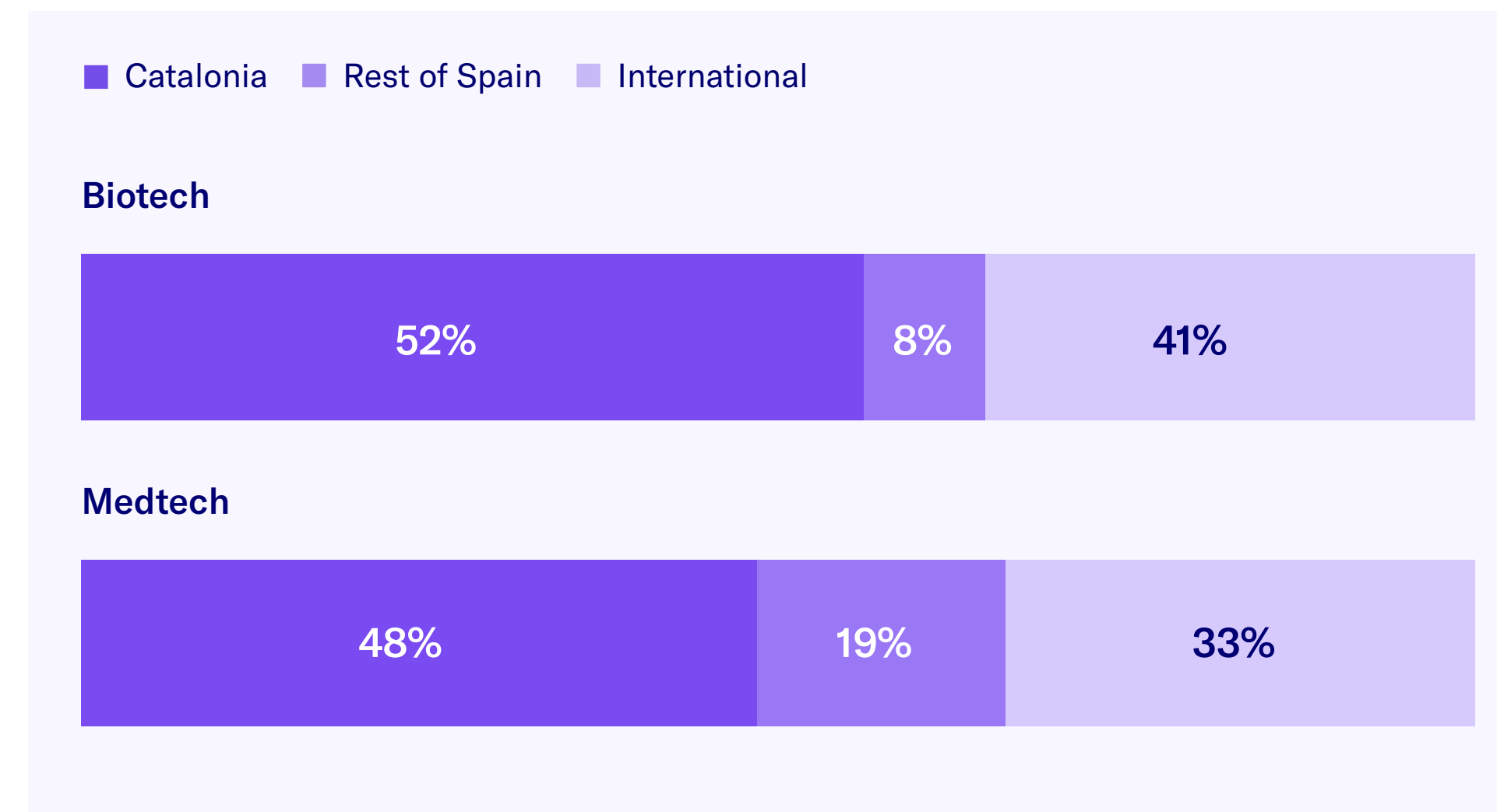
The analysis of R&D collaborations is included in this sector using data from the latest business survey by CataloniaBio & HealthTech. 50% and 28% of Catalan biotech and medtech companies (respectively) collaborate with research entities, and collaboration figures are lower in the private sector, with only 17% of biotech companies and 11% of medtech companies declaring they collaborate with other companies. In terms of geographic distribution, once again this year the figures indicate that almost half of these R&D collaborations are in Catalonia. This is, therefore, relevant data that shows the knowledge transfer capacity within the Catalan ecosystem. The positive trend of international collaborations is also highlighted, which remains between 41% and 33% for biotech and medtech for another year.

The network of research entities, hospitals and institutes linked to them is a key asset for the intense collaborative activity in innovative ecosystems, where companies compete for the best partners, technologies and networks. Collaborations between startups from the BioRegion with hospitals and hospital research institutes (46% in the case of biotech and 47% in medtech) must be noted. Data is also included of the collaboration agreements with research centres (23% and 26%) and universities (15% and 11%). In terms of collaboration with other companies, biotech and medtech firms primarily target SMEs or microcompanies (8% and 16%), and only biotech firms approach large companies (8%).

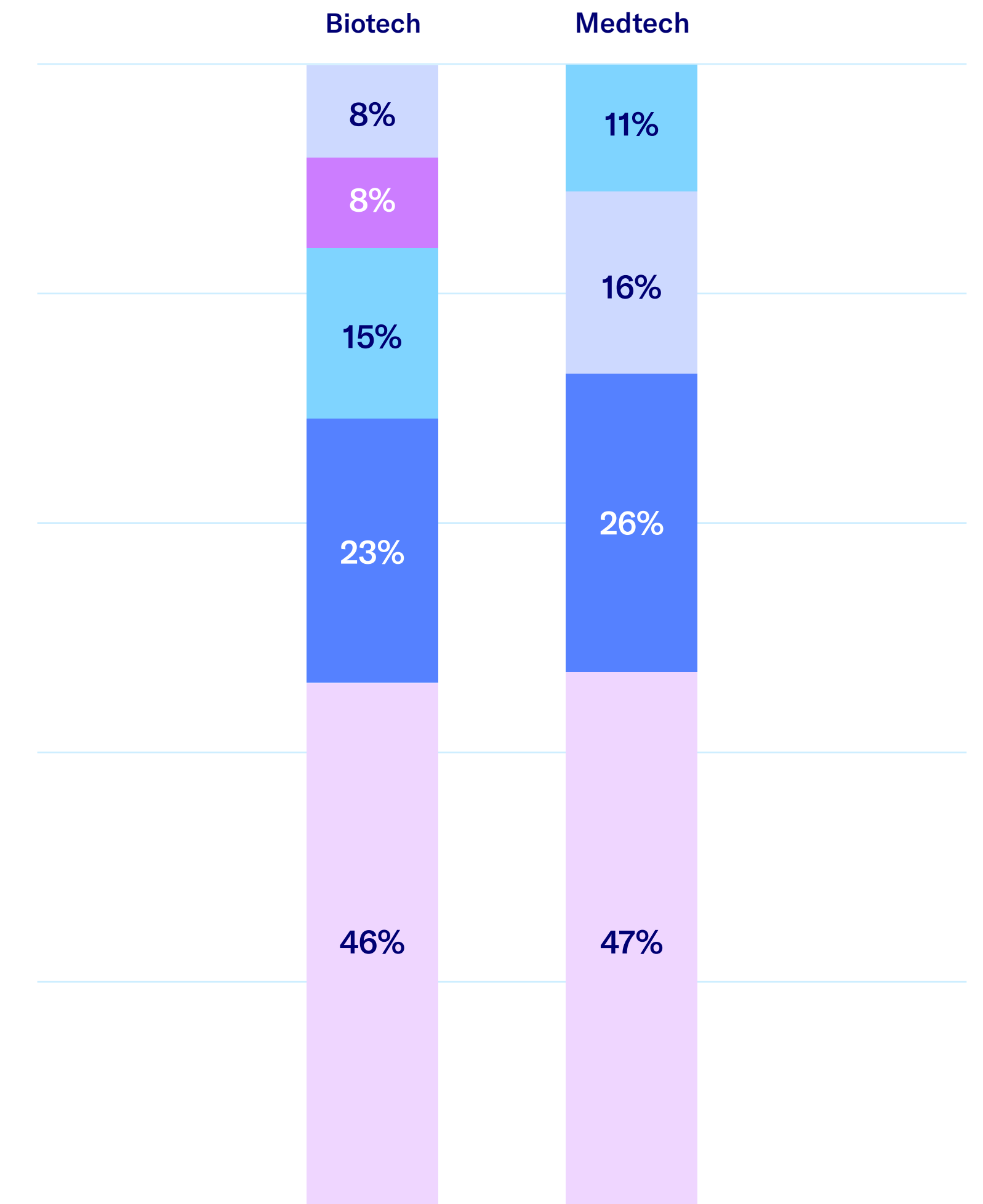
% biotech and medtech companies collaborating in R&D



Geographic distribution of investment in R&D



Distribution of the collaboration agreements per type of partner



- Hospitals and hospital research institutes
- Research centres
- Universities
- Large companies
- Microcompanies and SMEs

Source: Study on investment in the healthcare sector in Catalonia 2022. CataloniaBio & HealthTech and EY

Proposals to tackle industry-based challenges

This section includes a range of proposals in four specific areas that could help strengthen and improve the international competitiveness of the sector, as suggested by Farmaindustria, Fenin, and CataloniaBio & HealthTech:

- Fiscal, legal and/or tax-based proposals
- National policy
- Prompt incorporation
- Sector trend

Fiscal, legal and/or tax-based proposals ↘

- **Eliminate the deadline for applying for R&D+i deductions as set out in the Corporate Tax Law** (currently standing at 18 years) in order to avoid the loss of tax credit by R&D+i-intensive pharmaceutical companies. Despite this being a nationwide measure, accomplishing this would obviously have an extremely positive impact on the pharma companies established in Catalonia because, as discussed in this Report, they account for almost half the Spanish business network. Much of this tax credit ends up being lost at present. The measure would also encourage future investment in R&D+i in Catalonia, and would help avoid decentralisation to other regions that promote R&D+i and that are more fiscally attractive to research-intensive companies. Lastly, the type of expenses eligible for tax deductions and those incurred abroad but managed by the national company should also be increased/reviewed.
- **Apply super-reduced VAT rates to healthcare technology equipment and products:** from 21% VAT - currently applied to most products - to 4% VAT. The new European

directive allows for reduced VAT to be applied to healthcare products and, therefore, the European framework imposes no restrictions. This tax improvement could lead to savings in Catalonia and in the other autonomous regions of Spain and, therefore, would result in a direct improvement in healthcare by providing access to a greater amount of healthcare technologies while increasing resources allocated to digitisation, R&D+i, and the protection of public health, among others.

- **Improve taxation in entrepreneurial circles** for all agents involved, **for both entrepreneurs and for private capital funds**, on the returns obtained and on stock options. The scenario for companies to meet the requirements to be considered startups should generally be more attractive.

National policy ↘

- **Catalonia must be committed to promoting the implementation of the innovative pharmaceutical industry in its region**, using its deep roots in the area and its great growth potential in both R&D+i and drug production. The production of medicines and the taking of measures to implement new production plants and improve and expand existing ones should be encouraged.
- Catalonia must **strengthen the production of healthcare production** along four lines: 1) **Promote the public procurement** of innovation based on the value and on the impact on health results beyond economic criteria, thus increasing its benefit to the sector and to society; 2) **Streamline market access**, generating a new route to reduce times while maintaining the same quality standards; 3) **Introduce financial and fiscal instruments** to encourage industrial implementation while improving measures for the existing industry; 4) **Reduce the bureaucracy of the processes** involving the healthcare industry that hinder and raise the price of product manufacturing, access, and sales processes.
- **Catalonia must continue to leverage clinical R&D+i** (promoting a clinical biomedical research ecosystem and encouraging public-private cooperation, as well as fostering the decentralisation of clinical trials outside the area of Barcelona) **and pre-clinical R&D+i:** intensifying cooperation among pharmaceutical companies, biotech SMEs, and research groups in Catalonia to develop innovative new drugs.

- **Catalonia must promote access by patients to the best medicines and technologies available for treatments**, promoting public funding for the innovations, and acting as a benchmark in the access to innovative healthcare drugs and technologies nationwide.
- In order to optimise resources, **the development of technology platforms, scientific-technical services, and cross-cutting production** should be considered to meet to public and private needs in the development of drugs. This would avoid outsourcing to US companies - which have exclusivity or monopoly - in fields such as recombinant proteins, cell expression, and modified cell lines or in the lipid-encapsulation of vaccines, among others.
- **The BioRegion of Catalonia must have a Sector-Based Plan** that includes specific strategies and action for the life sciences and healthcare sector, enabling it to strengthen, consolidate and maximise its impact on the country's economic and social development. This involves defining the industry's participation in current sector-based formulas (concept trials, boosting of public procurement, and the Advanced therapies hub), and sectorising other formulas that exist in the 2022-25 National Pact for Industry.

Proposals to tackle industry-based challenges

This section includes a range of proposals in four specific areas that could help strengthen and improve the international competitiveness of the sector, as suggested by Farmaindustria, Fenin, and CataloniaBio & HealthTech:

- Fiscal, legal and/or tax-based proposals
- National policy
- Prompt incorporation
- Sector trend

Prompt incorporation ↘

- **Digitisation of the health system.** Promoting the digitisation of healthcare systems and research with real world data (RWE/RWD) are very important initiatives that are under development in Europe due to the benefits they may have in terms of improving the efficiency of the healthcare systems and improving patient health results. The digitisation of research processes must be coordinated with the welfare processes of the healthcare system in Catalonia before being integrated into a data lake of health data for Spain and Europe (SNS Digital Health Strategy and European Health Data Space). To do so, support must be given to improving and applying a common data model, with Europe-wide initiatives that help promote the change in the BioRegion.
- **Reimbursement of digital technologies.** A business model should be developed and implemented that financially encourages - in a suitable manner - the use of digital tools and medical devices in the health sector, once their utility, efficacy and safety has been proven. The German model (DIGA, Digital Health Fast Track Process) should be highlighted here, which streamlines the process for introducing and implementing digital health solutions, or the Belgian mHealth validation pyramid, which enables digital health manufacturers to meet temporary or permanent reimbursement requirements for the app. Other models to be followed include those of the United Kingdom and France, which support innovations on their entry into the Health system.

Sector trend ↘

- **Promote precision and genomic medicine, predictive medicine and innovative therapies.** Among others, imaging diagnostics/molecular diagnostics/biomarkers/companion diagnostics should be fostered to continue developing research in these areas. This will improve the early diagnosis of diseases and the implementation of specific therapies for each patient.
- **Promote pre-clinical and clinical research into minority diseases and in the paediatric population.** The work performed by Catalan hospitals in this area must be highlighted, which are already taking part in international initiatives that require close public-private collaboration. This issue is particularly relevant at a time when the definition of the European Pharmaceutical Strategy is being ultimated, which could have a considerable impact on the incentive to invest in R&D+i into new medicines and drug repositioning in Europe

5

Market Access



Photograph: HIPRA



Market Access by innovative pharma molecules (2012-2022)

Innovative Medicines

The launch sequence follows the general trends observed in the launch of innovative products, launching first in Germany where there is a oneyear period of free price-setting(1). Despite the fact that the companies analysed are local, Spain is the country where it takes longest to reach the market, with an average of 2 years and 8 months. Furthermore, prices do not follow the usual trends, most likely due to the small representative group and the difference among therapeutic areas. To all extents and purposes, the higher prices in Italy, Spain and the United Kingdom could be explained through confidential discounts permitted in these markets.

Sequential Innovation⁽²⁾ (Hybrid)

A clear trend can be observed in favour of launching products only in Spain, possibly due to the fact that evidence is compiled locally, to the presence of competitors in other countries, and to the different criteria for assessing hybrids medicines in Europe. In terms of the pipeline, research into new molecules follows the trend of previously launched products with a clear balance between innovation and sequential innovation.

Market access table

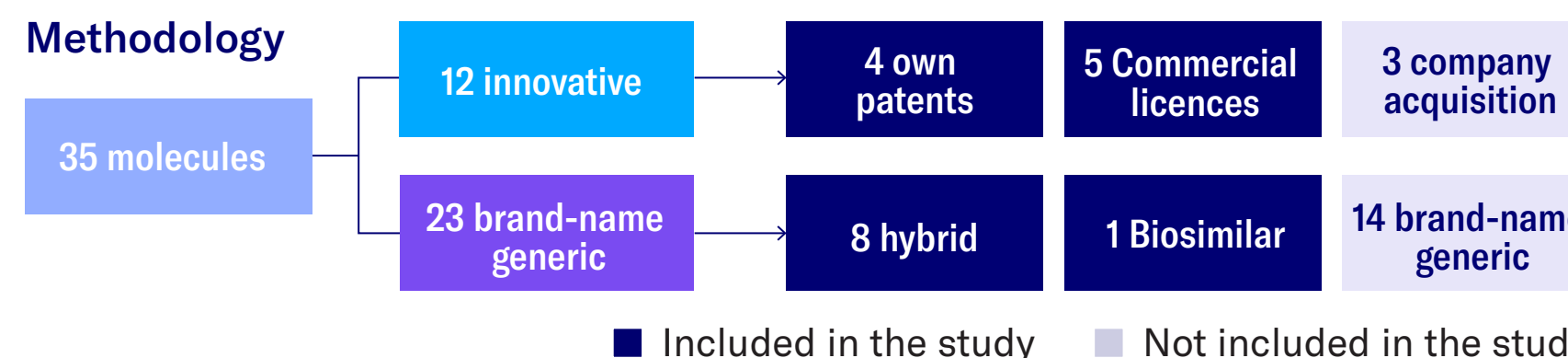
Innovative		DE	UK ⁽³⁾	IT	FR	ES
Time between authorisation and launch	Min (days)	4	75	281	266	349
	Ave. (days)	225	614	620	673	1,008
	Mean (days)	82	325	489	768	1,043
	Max. (days)	1,207	1,429	1,451	895	1,595
	Position	1	2	3	4	5
Price level	Min.	€52	€67	€33	€52	€30
	Ave.	€1,312	€1,074	€1,594	€1,502	€1,552
	Mean	€443	€335	€152	€2,222	€306
	Max.	€3,500	€3,747	€5,500	€2,232	€4,650
	Position	4	1	2	5	3

Public access

Therapeutic area	Molecule	DE	UK ⁽³⁾	IT	FR	ES
Neurology	AD	●	● Min. Price	●		●
Oncology	AK	●	●	●	● Min. Price	
Dermatology	IL	●	● Max. Price	●	●	●
Haematology	KE	● Max. Price	●	●		
Dermatology	KL	● Min. Price	●	●		●
Pneumology	SE			● Min. Price		● Min. Price
Dermatology	SK	●	●	●		●
Haematology	TA	●		● Max. Price	● Max. Price	● Max. Price
Haematology	VE	●	●			●

● With public reimbursement

Methodology



Companies included in the study:



Sources: Hs-Sante and Légifrance (France), G-Ba and Lauer Taxe (Germany), Gazzetta ufficiale (Italy), AEMPS and Bot Plus (Spain), NHS Business services authority and NICE (United Kingdom). Internal experience of Alira Health

Notes: (1) The new change in regulation reduces the free price-setting time to 6 months (2) A hybrid medicine has a generic active substance that provides added value in one of the following three factors: (i) different indication (ii) different route of administration, (iii) combination with another molecule (3) Exchange rate £1=€1.15624 (4) Biosimilar

AD: Adasuve®; AK: Akynzeo®; DU: Duratil®; IL: Ilumetri®; IN: Inbrija®; KE: Kengrexal®; KL: Klisyri®; NI: Nictur®; SE: Seebri Breezhaler®; SK: Skilarance®; TA: Tavlesse®; VE: VeraSeal® AL: Alzerta®; BA: Bandol®; CE: Cetraflux®; DU: Duratil®; EK: Ekzem®; IV: Iluvien®; IN: Inbruja®; NI: Nictur®; NP: Nife-Par® | DE: Germany; UK: United Kingdom; IT: Italy; FR: France; ES: Spain

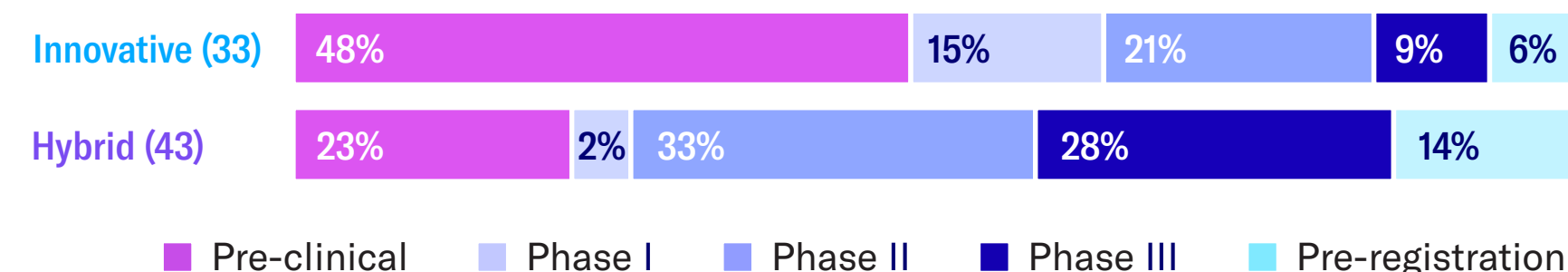
Hybrid		DE	UK ⁽³⁾	IT	FR	ES
Time between authorisation and launch	Min (days)	83	199	3,450	169	137
	Ave. (days)	519	199	3,450	169	719
	Mean (days)	519	199	3,450	169	482
	Max. (days)	955	199	3,450	169	1,825
	Position	3	2	4	1	5
Price level	Min.	€391	€6,293	€7,576	€5,626	€3
	Ave.	€4,502	€6,293	€7,576	€5,626	€1,070
	Mean	€4,502	€6,293	€7,576	€5,626	€35
	Max.	€8,615	€6,293	€7,576	€5,626	€7,975
	Position	3	1	2	5	4

Public access

Therapeutic area	Molecule	DE	UK ⁽³⁾	IT	FR	ES
Neurology	AL					●
Urology	BA					
Ophthalmology	CE					● Min. Price
Rheumatology	DU ⁽⁴⁾					●
Otics	EK					●
Ophthalmology	IV	● Max. Price	●	●	●	● Max. Price
Neurology	IN	● Min. Price				
Endocrinology	NI					●
Gynaecology	NP					●

● With public reimbursement

Pipeline



Access to the public and private market by Catalonia headquartered medtech startups

According to the companies surveyed, entering the public or private market is easier for technologies that do not require regulatory classification (I, IIa, IIb, III), normally associated to digital solutions, such as apps or platforms. However, products with regulatory classification have higher levels of internationalisation and public reimbursement. Despite this, those reaching the public market often find it more difficult to identify a valid interlocutor for the procurement and to guarantee the safety and interoperability of their products. Finally, companies seeking reimbursement only in Catalonia and/or Spain find it easier to identify the requirements than those also seeking reimbursement in Europe, mostly likely due to the lack of language barriers and to a greater knowledge of the system. Although accessing the public market may seem more complex for Catalan companies—even more so now with the arrival of new regulatory changes in Europe (MDR and IVDR) that will increase the entry requirements to the public system—traditionally, the public MedTech and IVD market has generally had a greater volume and margin than the private, despite the increased budgetary control of recent years. The strategy of many companies is, therefore, to start with the private market in order to obtain resources and allocate them to the clinical development required to take the leap into the public system.

Market access table

🗨️ Least benefited group 👍 Most benefited group

N=146 ⁽¹⁾ products in the survey	Likelihood of entering any market	With regulatory classification	Without regulatory classification
	Which companies are more likely to access the market (public or private)?	41% of the products with classification and available in the market	67% of the products without classification and available in the market  26%*
N=75 ⁽¹⁾ products in the survey	Once in the market, likelihood of reimbursement and internationalisation	With regulatory classification	Without regulatory classification
	Of those already in the market, which are most likely to be internationalised in the public or private markets?	72% of the products with classification and in international markets  22%*	50% of the products without classification and in international markets
	Of those already in the market, which are most likely to obtain public reimbursement?	48% of the products without classification and public reimbursement  13%	31% of the products without classification and public reimbursement
N=75 ⁽²⁾ products in the survey	Difficulty between entering the public and the private market	Public market	Private market
	Which companies have found it most difficult to find a valid interlocutor for the procurement?	4.2 Average difficulty of companies with public reimbursement  10%	3.8 Average difficulty of companies without public reimbursement
	Which companies have found it most difficult to guarantee the safety and interoperability of their products?	3.7 Average difficulty of companies with public reimbursement  28%*	2.9 Average difficulty of companies without public reimbursement
N=30 ⁽²⁾ products with reimbursement	Difficulty between obtaining public reimbursement in ES/CAT and EU	Public reimbursement CAT/ES	Public reimbursement EU
	Which companies have found it most difficult to identify the requirements to access the public system?	3.4 Average difficulty of companies with public reimbursement CAT/ES	4.1 Average difficulty of companies with public reimbursement Europe  20%*

Sources: Survey and internal analysis by Alira Health

Notes: *Statistically significant different, 95% confidence level. (1) All products in the survey in which there is a direct relationship between the type of product classification and whether it is in the public or private market or in the process of reaching either one. (2) Relationship between the products in the public or private market and the general difficulty of the company in the different variables. If a company has more than one product, the same difficulty has been associated to them all | MDR: Medical Device Regulation; IVDR: In Vitro Diagnostics Regulation

Conclusions

Catalan pharmaceutical network

Half the Catalan innovative molecules are a result of licensing agreements ↘

- Around half of these molecules have been acquired through commercialisation licensing agreements. This involves less room for manoeuvre in complying with contractual obligations and, therefore, a market access strategy that is normally less restricted than for proprietary molecules.

Market access times in Spain are the highest ↘

- It also takes longer for Catalan companies to access the Spanish market with their products than in the largest markets in Europe. The fact that they are managed or researched from the same country does not lead to shorter access times.

The future of innovation in Catalonia could tend towards innovation in advanced therapies ↘

- The tendency of Catalan pharmaceutical research seems to indicate that the equal distribution between innovative and hybrid molecules in the market will not change over the coming years. Despite this, initiatives such as that of the Advanced Therapies Centre will serve to change the trend towards innovation.

Hybrid medicines have different regulatory recognition from innovative medicines ↘

- Hybrid medicines are recognised by the EMA and the national authorities as a different entity requiring a specific regulatory process. Both cases require clinical evidence to justify the benefit-risk of the new medicine, and not only bioequivalence studies.

Payers do not value hybrid and innovative medicines in the same manner ↘

- In terms of market access, payers find it difficult to value hybrid medicines during price and reimbursement negotiations. This price difference compared with innovative medicines is not observed in the sample analysed, due to the few hybrid medicines outside Spain, which indicates the risk of a lack of recognition in other countries.

The availability of hybrid medicines is often more limited ↘

- Innovative molecules are normally available in more than one market, possibly through centralised authorisation via the EMA, whereas hybrid medicines have more limited access and are often decentrally authorised via national agencies.

Investment into generating evidence is a key factor in the difference in access ↘

- One of the reasons that helps explain the above point is evidence, which is normally scarcer for hybrid medicines due to the lower market opportunity. For the products analysed, it is considered that evidence has only be generated in Spain and, therefore, only this market has generally been accessed.

Not all public prices are those that the health systems end up paying ↘

- In Italy, Spain and the United Kingdom, confidential discounts are permitted on the gross price. This lack of transparency means that the price comparisons are not entirely true, and it must be assumed that the price that the health system ends up paying in these three countries is lower than that published.

Catalan Medtech and IVD startup network

Products without regulatory classification find it easier to access the market ↘

- Technological solutions without regulatory classification are those that do not clearly and directly meet a medical requirement. They are therefore normally apps or digital platforms as solutions for telemedicine, health data aggregators, healthcare logistics control software or solutions for health research and development, among others.
- Given that they require no classification (Class I, IIa, IIb, III), these types of solution find it faster to meet the regulatory requirements (ISOs, QMS, CE marks) necessary to begin commercialisation. In addition to the regulation is the fact that they often have a direct impact on the efficiency of public and private centres. These types of solution, therefore, have a greater presence in the market.

Products with regulatory classification often have greater international presence ↘

- Companies with regulatory classification, i.e. those related with Medical Devices or IVD with a measurable medical impact find it easier to find public or private customers outside Catalonia or Spain.
- This might be explained by the presence of more local competition in the other types of solution or because they have a clear regulatory framework accepted by the EU, which could make exporting easier.

Products with medical impact have greater public reimbursement ↘

- Companies with regulatory classification have a higher level of public reimbursement than those without classification.
- This is explained by the reticence of European public payers to fund solutions with no direct medical impact. Likewise, it is increasingly important for European public funders for the clinical evidence to come from patients residing in their countries.
- The increasingly restrictive trend of the public payer regarding the requirements and quality of evidence is increased by the Europe-wide introduction of the MDR and IVDR (Medical Device / In Vitro Diagnostics Regulation).

Access to public reimbursement is easier in the company's own market ↘

- Companies that have obtained public funding only in Catalonia and/or Spain have found it less difficult to understand the price and reimbursement requirements than those with public funding in other European countries.
- The lack of language barriers, the ease of interaction with the local health authorities, and the possible need to pay for specific external knowledge on access to the public market in Europe might explain the increased difficulty.

Methodology

The BioRegion of Catalonia is the life sciences and healthcare ecosystem in Catalonia and the subject of this Report, which Biocat has published since 2009.

The sources used are referenced on each page, but this Methodology section defines the concepts or expands on information that may provide a better understanding of the figures and key indicators. If you have any questions about this, or if you feel your company has not been properly reflected in the chapter on investment, please contact us at comunicacio@biocat.cat.

The basis for the analysis in this Report is taken from the [Biocat Directory \(Catalonia Health & Life Sciences Data Platform\)](#), which covers more than 1,500 companies and organisations operating in Catalonia in the life sciences and health arena. This data is then cross-referenced with the Biocat CRM, which has nearly 10,000 organisations and over 30,000 contacts. Throughout the Report we refer to “subsectors” to include the biotech, pharma, medtech and digital health sectors comprising the sector as a whole. The definitions of the companies belonging to each subsector are available on the website of the Directory.

The study of data on [company turnover and employment](#) was taken from SABI (Iberian Balance Sheet Analysis System), a database that collects information from the annual accounts submitted to the Business Registry (last data available 2021). Companies that operate in the region but do not have their official business address in Catalonia are not counted. The method for calculating the sector’s weight in terms of the GDP (gross domestic product) is available on page 45 of the 2017 Biocat Report, which is on the [Biocat website](#).

The information on [fDi Markets](#) is a collaboration with ACCIÓ. The methodology is published on page 15 of its report [Foreign investment in Catalonia 2021](#).

Analysis of the chapter [“Investment in startups and scaleups”](#) is the result of sector-based monitoring by Biocat of startups and innovative

companies from the main subsectors established in the BioRegion. Data on public and private capital, through formal investment vehicles or instruments, is compiled. The usual source of the data is the company itself or public sources (press releases, news articles, investors, VC reports or personal contacts, etc.).

The indicators on company activity in the chapter [“Other insights on business activity”](#) are taken from the collaboration with the associations CataloniaBio & HealthTech, Farmaindustria, and Fenin. The studies referring to each indicator, primarily through company surveys, can be consulted for further information on the methodology.

The [international comparisons](#) include the highest number of European countries with data available or a comparable vision of the countries (peer countries), where regions with similar socioeconomic characteristics (democratic European countries with a population of between 5 and 20 inhabitants) are considered.

The [“Transfer of research centres in spinoffs”](#) section is an analysis of the CERCA centres working in the health sector in Catalonia, the BSC, and Eurecat (centres with 2 or more spinoffs). “Ratio of funding to researchers at the research centres” includes the average funding of the centre (financially competitive and not competitive) and the total number of FTE (full time equivalent) researchers between 2015 and 2019. The investment attracted includes the total investment (VC/PE, crowdequity, venture debt, stock market and competitive grants) raised by the spinoffs since their creation.

Initials of the Research Centres (page 29)

- Barcelona Supercomputing Center
- CIMNE: Centre Internacional de Mètodes Numèrics a l'Enginyeria (International Centre of Numerical Methods in Engineering)
- CRG: Centre de Regulació Genòmica (Centre for Genomic Regulation)
- EURECAT: Centre Tecnològic de Catalunya (Technology Centre of Catalonia)
- FCRB-IDIBAPS: Fundació Clínic per a la Recerca Biomèdica - Institut d'Investigacions Biomèdiques August Pi i Sunyer (Clinical Foundation for Biomedical Research - August Pi i Sunyer Institute of Biomedical Research)
- IBEC: Institut de Bioenginyeria de Catalunya (Institute of Bioengineering of Catalonia)
- I3PT: Institut d'Investigació i Innovació Parc Taulí (Parc Taulí Institute of Research and Innovation)
- ICFO: Institut de Ciències Fotòniques (Institute of Photonic Sciences)
- ICN2: Institut Català de Nanociència i Nanotecnologia (Catalan Institute of Nanoscience and Nanotechnology)
- IDIBELL: Institut d'Investigació Biomèdica de Bellvitge (Bellvitge Biomedical Research Institute)
- IDIBGi: Institut d'Investigació Biomèdica de Girona (Biomedical Research Institute of Girona)
- IGTP: Institut d'Investigació en Ciències de la Salut Germans Trias i Pujol (Germans Trias i Pujol Institute of Health Science Research)
- IISPV: Institut d'Investigació Sanitària Pere Virgili (Pere Virgili Health Research Institute)
- IJC: Institut de Recerca contra la Leucèmia Josep Carreras (Josep Carreras Leukaemia Research Institute)
- IMIM: Institut Hospital del Mar d'Investigacions Mèdiques (Hospital del Mar Medical Research Institute)
- IRB Barcelona: Institut de Recerca Biomèdica de Barcelona (Biomedical Research Institute of Barcelona)
- IRB Lleida: Institut de Recerca Biomèdica de Lleida (Biomedical Research Institute of Lleida)
- IRSantPau: Institut de Recerca Hospital de la Santa Creu i Sant Pau (Hospital de la Santa Creu i Sant Pau Research Institute)
- IRSICAIXA: Institut de Recerca de la Sida (AIDS Research Institute)
- IRSJD: Institut de Recerca Sant Joan de Déu (Sant Joan de Déu Research)

2022 BioRegion of Catalonia Report

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#BioRegionReport

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Barcelona, December 2022

Biocat is the institution that promotes the life sciences and healthcare ecosystem in Catalonia and works to maximize its economic and social impact. Biocat's strategy focuses on positioning the BioRegion of Catalonia as one of the leading hubs in Europe; offering acceleration and training programmes; attracting investment and supporting the internationalization of startups and scaleups. . Created in 2006 by the Government of Catalonia and the Barcelona City Council, Biocat also promotes far-reaching political strategies and projects aimed at contributing to Catalonia's competitiveness.

Biocat



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