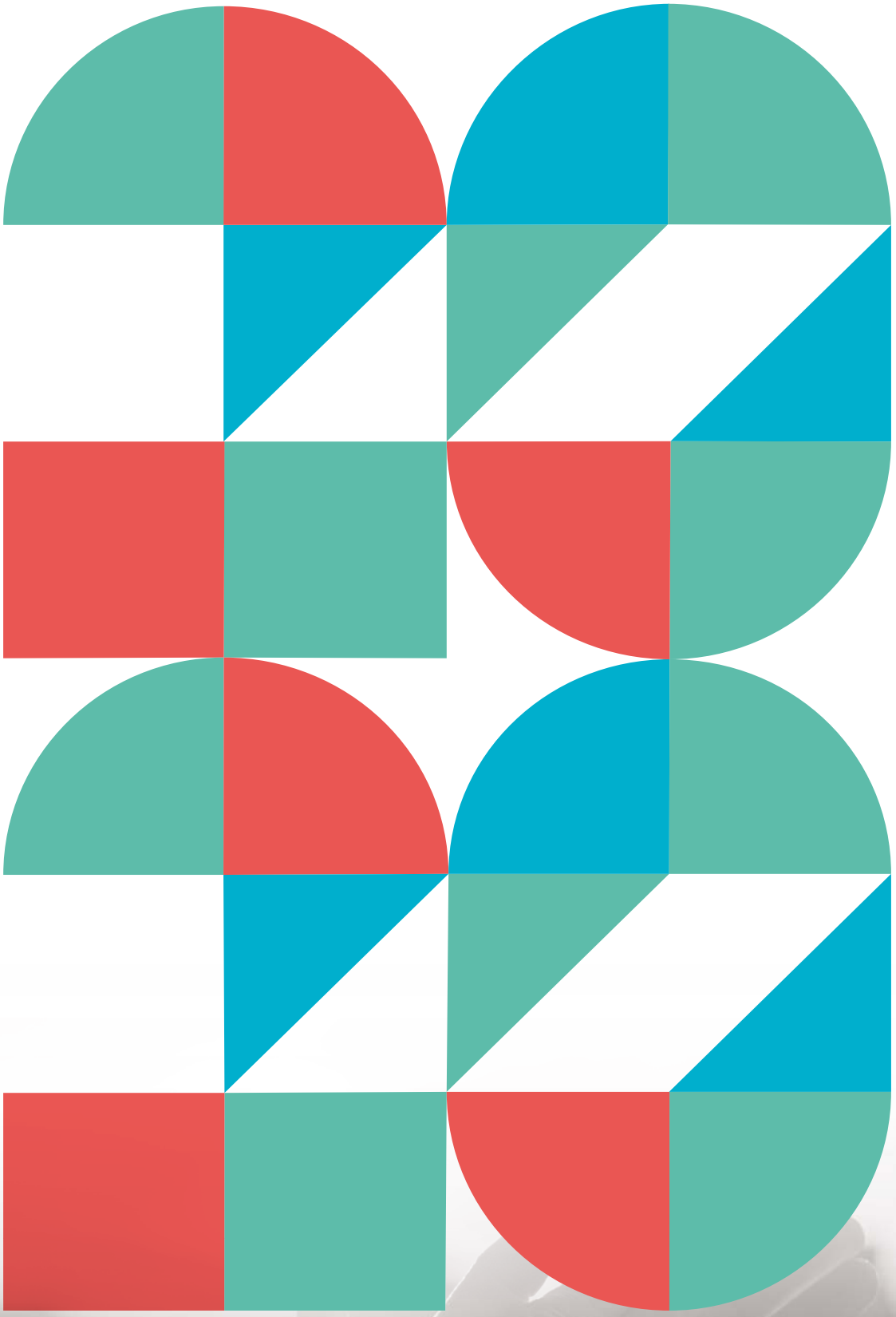

2020 ASEBIO REPORT

The year of biotechnology

GOBIERNO DE ESPAÑA
MINISTERIO DE INDUSTRIA, COMERCIO Y TURISMO
ICEX España Exportación e Inversiones
ASEBIO Asociación Española de Bioempresas

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LETTER FROM ANA POLANCO

In one year, since the 2019 AseBio Report was printed, we can say that biotechnology has taken a qualitative leap forward with a very positive impact on people's lives. Just nine months after the World Health Organisation declared the pandemic, we had access to the first vaccine in Spain. This was possible thanks to the biotechnology sector's hard work and the unprecedented collaboration among all the stakeholders in the science and technology system, public and private initiative, countries and multilateral bodies. There is still a lot to do before we can truly put the pandemic behind us and numerous challenges to face, but we can say that biotechnology has contributed to a historical milestone in science and innovation that some scientists have compared to the mission that put the first man on the moon. Today, one year later, biotechnology, with seven vaccines approved around the globe and over 200 in development, has proven its value for protecting people like no other technology.

Just a year ago, I had the honour of taking part in the Parliamentary Committee for the social and economic reconstruction of our country, presenting an agenda of actions to help us pull out of the pandemic and promote the social and economic recovery our country needs.
The committee's ruling incorporated these proposals aimed at deepening Spain's commitment to science and innovation and support for our industrial fabric.
This ruling was one of the documents that laid the groundwork for the Recovery, Transformation and Resilience Plan that Spain submitted to the European Commission.

Likewise, the Committee's ruling recognised the strategic value of biotechnology in our country, which has become even clearer in recent months.
The sector has shown great adaptability, working to find solutions in a complex race against the clock to provide vaccines, diagnostic tests and treatments. I am particularly proud of the immense resilience, growth and transformation of the Spanish biotechnology fabric, with 64 AseBio members working on 127 lines of research to fight the pandemic. I also want to highlight the Spanish agrifood sector's great response and potential from the very beginning of the pandemic, proving it can provide a steady flow of food through an efficient, united value chain.
I also have to mention the consolidated, highly dynamic biotechnology industry, which along with new, emerging biotech firms makes up an ecosystem of nearly 800 companies working on biotechnology developments "made in Spain". This industrial fabric made it possible to continue working at full capacity during the state of emergency to supply medicines to the 25 million citizens who take at least one every day.
Therefore, the way our sector has tackled the pandemic has shown it is a driving force for economic and social prosperity and strategic in leveraging the country's healthcare recovery and sustainability.

Nevertheless, beyond the pandemic, there are many other challenges we are also facing as a society, and the biotechnology sector, with its great capacity to transform society, has its sights set on them. We have ambitious agendas ahead, like those laid out in the Sustainable Development Goals (SDG) and the recent España 2050 plan. We are at a turning point and, alongside those global goals, we have European strategies and plans like the Pharmaceutical Strategy, Industrial Strategy, Green Deal and the Next Generation funds that will chart the course for our country's recovery and in which biotechnology will play a key role.
Indeed, biotechnology can be found in 11 of the 17 SDG. Furthermore, the European Commission has identified 100 radical innovations that will change the world, and biotechnology plays a key role in many of them, such as gene editing (with CRIPSR-CAS9 technology as the benchmark), gene therapy, bioplastics, the microbiome and genomic vaccines.

We are faced with the challenge of helping materialise the global, European and national agendas that will transform our lives.
Ambitious goals that will improve our health, our planet and our wellbeing, sustainably. Goals for the near future, for which we must lay solid foundations on which to build a more sustainable economy

Spanish Bioindustry Association that can generate wellness and opportunities for our society.
One of those foundations is undoubtedly the biotechnology sector, which as the 2020

AseBio Report reflects is a knowledge-intensive industrial sector capable of transforming investment in science and innovation into high-quality employment, economic growth, social wellbeing and biological solutions to improve our health, mitigate climate change,
conserve natural resources and facilitate a safer, more sustainable agrifood system.

This is why, over this past year, AseBio has worked to make biotechnology a tool to leverage transformation for the social and economic recovery of our country. Because biotechnology, as explained in the 2020 AseBio Report, has unquestionable potential in science and for fuelling economic growth.
We are the eighth world power in scientific production in biotechnology and fifth in the highly promising area of advanced therapies, plus our business fabric has become consolidated over the past decade.
We, therefore, have an unprecedented opportunity to strengthen access to biotechnology innovations, which are key for successfully tackling the healthcare emergencies we are experiencing. It is time to rethink what we want for our country and make R&D investment the heart of our recovery strategy.

We want to and must work to make biotechnology more present than ever on the public agenda and for our sector to keep working to improve people's lives and our planet. Science and biotechnology will continue to contribute, providing sustainable solutions to the needs we face as a society.

CHAIRWOMAN OF ASEBIO

LETTER FROM ION AROCENA VÉLEZ

2020 was a key year for the Spanish biotechnology sector.

While the sector worked against the clock to find ways to diagnose the disease, researched effective treatments and developed new vaccines, at AseBio we were working to position the biotechnology sector as key in tackling the Covid-19 healthcare emergency. So, since the beginning of the pandemic, we have made our drug discovery capabilities, as well as the services, products and materials of our member companies, available to the healthcare authorities. We also kicked off a task force of companies that manufacture and develop diagnostic tests in Spain to provide a coordinated joint response to the need for these tests in our country.

As a result, we have positioned and made biotechnology a strategic sector for the country.

It has been a difficult year for everyone and we couldn't meet in person, but necessity being the mother of invention, we managed to host five large digital events to bring us closer than ever to our community.

Here at AseBio, we've worked to position biotechnology within the country's recovery strategy.

The 2019 AseBio Report and the Science and Innovation for Recovery event are a good example of this, and have helped position R&D and biotechnology as driving forces for the country's recovery. For the first time, these events featured notable public figures like Nicolás Negroponte, founder of the MIT Media Lab, and Carlos Moedas. Plus top leaders like Dirk Pilat, deputy director of the Directorate for Science, Technology and Innovation at the OECD, and

Jean-Eric Paquet, director general of the European Commission.

For the first time, we hosted the Health Innovation Forum with support from the World Health Organisation, which helped position biotechnology on the recovery strategy and as a key sector for strengthening our national health system through strategic areas like oncology, advanced therapies and precision medicine.

Furthermore, we have continued working on some of our most consolidated events, such as the third edition of AseBio Investor Day, held to facilitate access to funding in the Spanish biotechnology sector by connecting our companies and projects with international investors and large pharmaceutical corporations.

We have also positioned the biotechnology sector in the green transition through the bioeconomy and sustainable agrifood practices with the 4th Green Innovation Forum, with participation from the FAO and the European Commission. And, thanks to our Biobridges and Biovoices projects, we have facilitated access to bioproducts for society, media and large brands.

2020 was a key year for the Spanish biotechnology sector and for the association that represents it too. This year highlighted the scope of the global and national challenges we are facing and the need to tackle them through collaboration among all the stakeholders in the system: from private companies to administrations, public and corporate research and companies both large and small, national and international. Aware of this, we have strengthened our relationships through initiatives like the Science and Innovation call we launched with SOMMa and ASEICA, which gained support from over 40 organisations in the science and innovation arena.

Furthermore, we have reinforced our connections with the administration, at various levels of government and legislative bodies, and we have opened our doors to society in order to make sure biotechnology is on the public agenda and that our voice is heard with regard to the many initiatives under way.

Spanish biotechnology has earned the right to play a key role in our recovery thanks to its hard work in fighting the pandemic. Plus, this report shows that we have strengths we can use to drive an industry that is knowledge based, competitive, transformative and high impact. As a country, we have the responsibility to make the most of this opportunity and AseBio will continue to work tirelessly to achieve that. Are you with us?

CEO OF ASEBIO

CONTENTS

2020 ASEBIO REPORT

INTRODUCTION

INTRODUCTION

The AseBio Report, considered the benchmark publication for the Spanish biotechnology sector since 2003, is published annually by the Spanish Bioindustry Association to provide a snapshot of the biotechnology sector in Spain. Its mission is to analyse every area that makes up the situation in which biotechnology is being developed in our country today, and how it is evolving.
As it does every year, this Report provides a general overview of the status of the biotech sector, with several analyses of R&D investment, the most important financial operations, the sector's economic impact, the talent working in the sector, and the biotechnology ecosystem in Spain, as well as studies on how science and biotechnology are perceived, and scientific and technological production measured in publications, patents, and products and services launched to market.
Continuing on from the 2019 AseBio Report, this time we have analysed how biotechnology contributes to 11 of the 17 Sustainable Development Goals. And, finally, we look at how biotechnology has responded to the Covid-19 pandemic.
This Report is mainly geared towards those who, for their professional (businesspeople, public officials, legislators, professionals at financial institutions, media outlets, scientists and bioentrepreneurs, among others) or personal interest, would like a clear snapshot of biotechnology in Spain.

Content

The 2020 AseBio Report has 13 sections. Each of its chapters takes a closer look at the most important issues affecting the Spanish biotechnology sector:

• Introduction and executive summary: introduce the Report, its scope and main goals, plus a brief summary of its overall content.

• R&D investment (chapter 1): covers R&D investment in the sector, how it has evolved and a comparison to other sectors.

• Funding (chapter 2): describes the main financial operations, venture capital activity in 2020 and how it has evolved, and the public administration's support for the sector.

• Talent and diversity (chapter 3): shows the number of students enrolled in biotechnology, researchers in the sector and female representation in the sector.

• Business fabric (chapter 4): analyses the number of companies that make up the sector and how it has evolved. It also provides information on what these companies are like, where they are located and the sector's ecosystem.

• Environmental conditions (chapter 5): assesses how society perceives science and innovation, how the biotechnology sector perceives its environment, and the impact of the pandemic.

• Results of the biotech sector (chapter 6): includes scientific publications, what the sector has patented, the main advances and products and services launched to market.

• Collaboration and Internationalisation (chapter 7): we include the alliances established in the sector in 2020 and international markets companies have moved into.

• Impact (chapter 9): analyses the biotechnology sector's impact on the economy and employment. There is also a section on how AseBio members are working to achieve the Sustainable Development Goals (SDG).

• Biotechnology and Recovery (chapter 10): includes how AseBio believes biotechnology will be key to the country's recovery after the healthcare crisis.

• Who's who?: features information on members of the AseBio Board of Directors, Work Committees and our members.

• Methodology: explains the methodology used to compile the 2020 AseBio Report.

Thanks

AseBio would like to thank all our collaborators for their support. Without their help, this report would not have been possible. And, especially:

• MERCK, our main partner, and Algenex, Bayer, Bioibérica, Biolan, Biorizon Biotech, CRG, Ingenasa, ICEX, IQS, Neiker, Madrid Science Park, PharmaMar, Promega Biotech and Vivebiotech.

• All our members who have contributed the information needed to draft the content of this report.

• The National Statistics Institute (INE) and the Economic Forecasting Center (CEPREDE) for their help in compiling the statistics on the sector.

• The Department of Studies and Indicators at the Spanish Foundation for Science and Technology (FECYT) for the information contributed for the section on scientific production.

• The Madrid Science Park and ClarkeModet for their analysis of patents applied for and granted in 2020.

• All the organisations that helped identify companies set up in 2020.

• The State Research Agency (AEI), the Centre for the Development of Industrial Technology (CDTI), the National Innovation Company (ENISA) and the Spanish Venture Capital and Private Equity Association (ASCRI) for their collaboration on the chapter on funding.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

R&D INVESTMENT

Record R&D investment in the biotechnology sector.

In 2019, the biotechnology sector invested over €940 million in R&D, 71% from biotech companies.

This investment comes mainly from the companies' own funds and 30% goes to pay researchers.
Biotech firms have doubled their R&D investment in the past 10 years and set a record in 2019, with investment up 22% over the previous year. Plus, the sector is ranked first in R&D investment after services and education and among the fastest-growing in R&D investment.

FUNDING

The number of private capital increase operations and participation of international investors increased.

In 2020, the joint total of funding in the biotech sector and number of operations grew once again. The total surpassed €150 million in 42 operations in 2020, and international investors remain interested in Spanish biotechnology.

New instruments like CDTI Innvierte and international financial entities came on board and crowdfunding once again raised over €10 million in operations involving biotechnology companies.

Funding through public instruments rose, mainly due to the extraordinary calls for funding for the Covid-19 healthcare emergency.

TALENT AND DIVERSITY

The sector with the highest percentage of researchers and a leader in employing women in R&D activities.

The sector continues to attract young students, with more than 7,200 students enrolled in university studies in biotechnology last year.

Biotech companies have the highest percentage of researchers to total employees in the sector, surpassed only by R&D services companies, with researchers making up 15.45% of all employees.

The percentage of women doing R&D work at biotech firms has remained above 53% since 2012. In 2019, the figure held steady from 2018 at 55%. However, women still only make up 24.4% of executive teams at biotech firms, although this is well above the average of 2.9% for IBEX-35 companies.

BUSINESS FABRIC

3,585 companies carried out biotechnology activities in 2019, of which 790 are biotech firms.

In 2019, the growth in total number of companies working in biotechnology accelerated significantly, with average growth up 20% from 2018, meaning over 600 companies incorporated this year. Of this total, 790 are strictly biotechnology firms.

47% of biotech firms working exclusively in biotechnology do so in human health, followed those focused on food applications, at 43%. Plus, 51% are micro-SMEs, with fewer than 10 employees, and 45% are SMEs.

In terms of geographic breakdown, Catalonia, Madrid, Andalusia and the Basque Country are home to the most companies. Companies in Catalonia make up 54% of the total.

ENVIRONMENTAL CONDITIONS

Society's belief in Spanish science and innovation has improved, but its perception dropped relative to other European countries.

In less than a year, society's belief in scientific knowledge as the best basis for laws and regulations rose 30%. Plus, 77% of Spanish society sees innovation as a positive.

However, society's perception of the level of innovation in Spain relative to other countries in the European Union fell to 50.4%, putting Spanish innovation among the least developed countries in Europe.

Furthermore, AseBio members perceive the improvement in public opinion of biotechnology in 2020 as very positive to their work.

RESULTS OF THE BIOTECH SECTOR

The science produced by the Spanish biotechnology sector is excellent and its innovation is patented internationally.

Regarding production of scientific knowledge, Spanish biotechnology makes up 3.2% of global production and is cited 30% more than the global average in this area. Spain rose one position on the ranking by documents in biotechnology, to 8th in the world. Spanish biotechnology produces science of excellence, with 26% of papers among the top 10% most cited in the world.

The biotech sector is protecting its innovations more and more internationally, mainly through the European Patent Office (45%) and PCT patents (32%).

Companies have launched 70% more products and services to market, thanks to those associated with Covid-19.

COLLABORATION AND INTERNATIONALISATION

The sector is working together to tackle the pandemic and maintains its interest in international markets.

Biotech firms forged 59% more alliances and 40% of them were with organisations from the public sector. This increase is due to the sector pulling together to fight Covid-19, seeking new products to diagnose and predict it, working to create new treatments and vaccines, and collaborating to manufacture them.

AseBio members boosted their international presence 19% in 2020, with 35 member companies present in 48 countries.

IMPACT

The economic impact of the sector on the GDP is growing.

The joint activity of biotech companies generated over €10.1 billion in income, which is 0.8% of the Spanish GDP, and they saw nearly €12 billion in turnover, or 1% of the GDP. Plus, they contribute €4.2 billion in taxes, 0.3% of the GDP, and account for 117,700 jobs, 0.6% of national employment.

Biotech firms lead the ranking of economic activities with regard to growth in production, up 20.8% and with productivity and salary per employee more than double the national average.

Biotechnology has a direct impact on our planet and society, and is part of 11 of the 17 Sustainable Development Goals.

R&D INVESTMENT

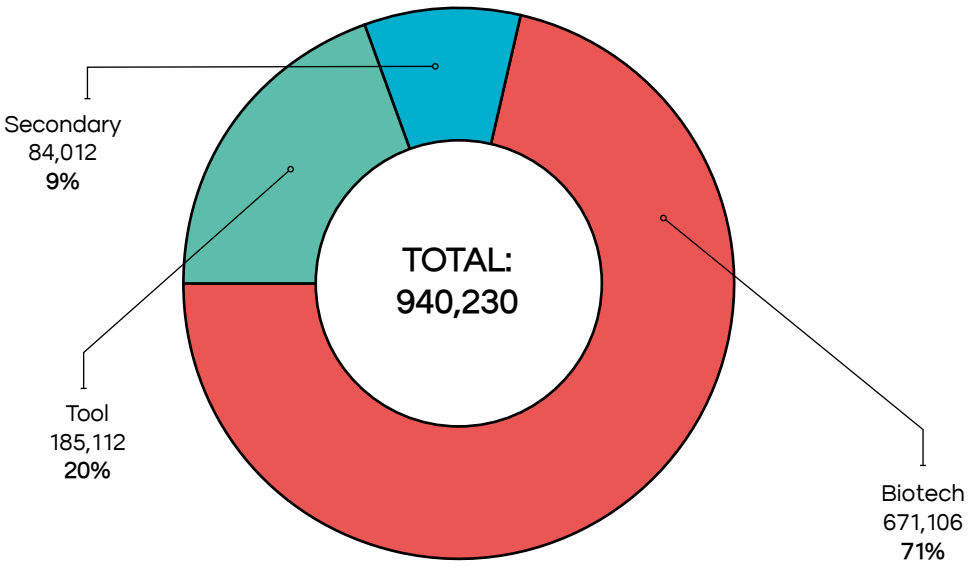
01

R&D INVESTMENT

Biotechnology companies invested €940 million in R&D in 2019, 6% of all R&D investment in Spain.

The biotechnology business sector, meaning companies with biotechnology as their main (biotech firms) or secondary activity, or that use it as a production tool, invested more than €940 million in R&D in 2019 (graph 1.1) in 2019, which is just over 6% of all Spanish investment in R&D. Biotech firms, compared to secondary companies and businesses that use it as a tool in their processes, remained at the core of this investment, with over 70% of the total.

R&D INVESTMENT IN BIOTECHNOLOGY IN 2019 (€ THOUSANDS)



Graph 1.1. Breakdown of companies' R&D investment in biotechnology. Source: INE. 2019 Survey on Biotechnology Use.

R&D investment by biotechnology companies comes mainly from their own funds and 30% goes to pay researchers.

R&D investment by biotechnology companies comes mainly from their own funds, which continue to be their main source of funding, making up 63% of the total (table 1.1). These are followed by 14% of funding from the business sector and 12% from funds in other countries. Only 10% of the R&D funds of biotech companies are from the public administration and higher education.

	Biotech	Secondary	Tool	Biotechnology total
Internal R&D expenditure in biotechnology	671,106	84,012	185,112	940,230
A) By nature of the expenditure				
Operating expenses	624,784	75,356	171,672	871,813
Paying researchers	194,490	33,985	56,460	284,936
Paying technicians and assistants	96,140	14,239	37,875	148,254
Other operating expenses	334,154	27,132	77,337	438,623
Capital expenditures	46,322	8,656	13,440	68,417
Land and buildings	6,204	2,874	2,686	11,763
Equipment and instruments	24,588	5,378	9,674	39,641
Acquisition of specific R&D software	1,735	319	777	2,831
Other intellectual property products specifically for R&D	13,794	85	303	14,183
B) By source of funds				
Internal funds	421,224	39,177	116,886	577,287
Funds from the business sector	96,993	8,211	37,467	142,672
Funds from the public administration sector	64,741	18,219	19,670	102,630
Funds from the higher education sector	453	0	5	458
Funds from private non-profit institutions	8,141	196	1.294	9.631
Funds from the rest of the world	79,554	18,210	9,790	107,553

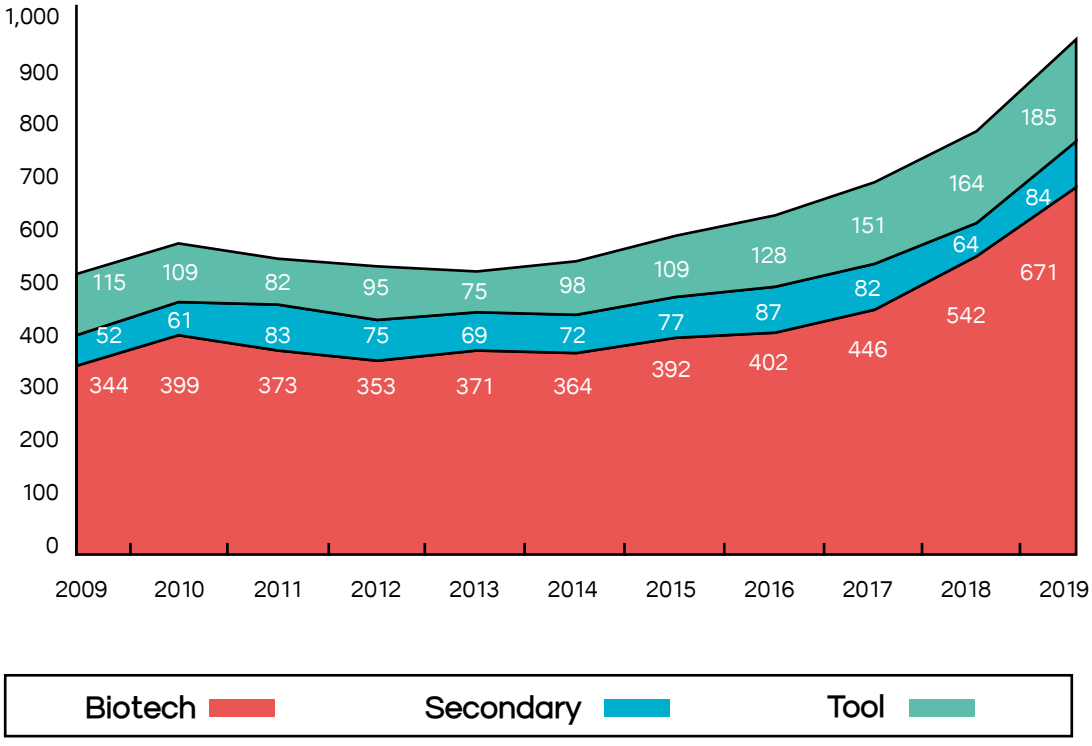
Table 1.1
R&D Investment in 2019 by nature of expenditure and source of funds (€ thousands). Source: INE. 2019 Survey on Biotechnology Use.

If we analyse the execution of R&D investment in detail, 93% goes to operating expenses. Of these operating expenses, 30% goes to paying researchers and 16% to paying technicians and assistants.
Nearly half of all expenditure, 47%, goes to other operating expenses. For biotech firms, the figures are similar to the sector as a whole, with 29% going to pay researchers and 50% to other operating expenses.

Regarding capital expenses, which make up roughly 7% of the total, nearly 60% goes to acquiring equipment and instruments and 20% to acquiring intellectual property rights.

Biotech firms have doubled their R&D investment in the past 10 years.

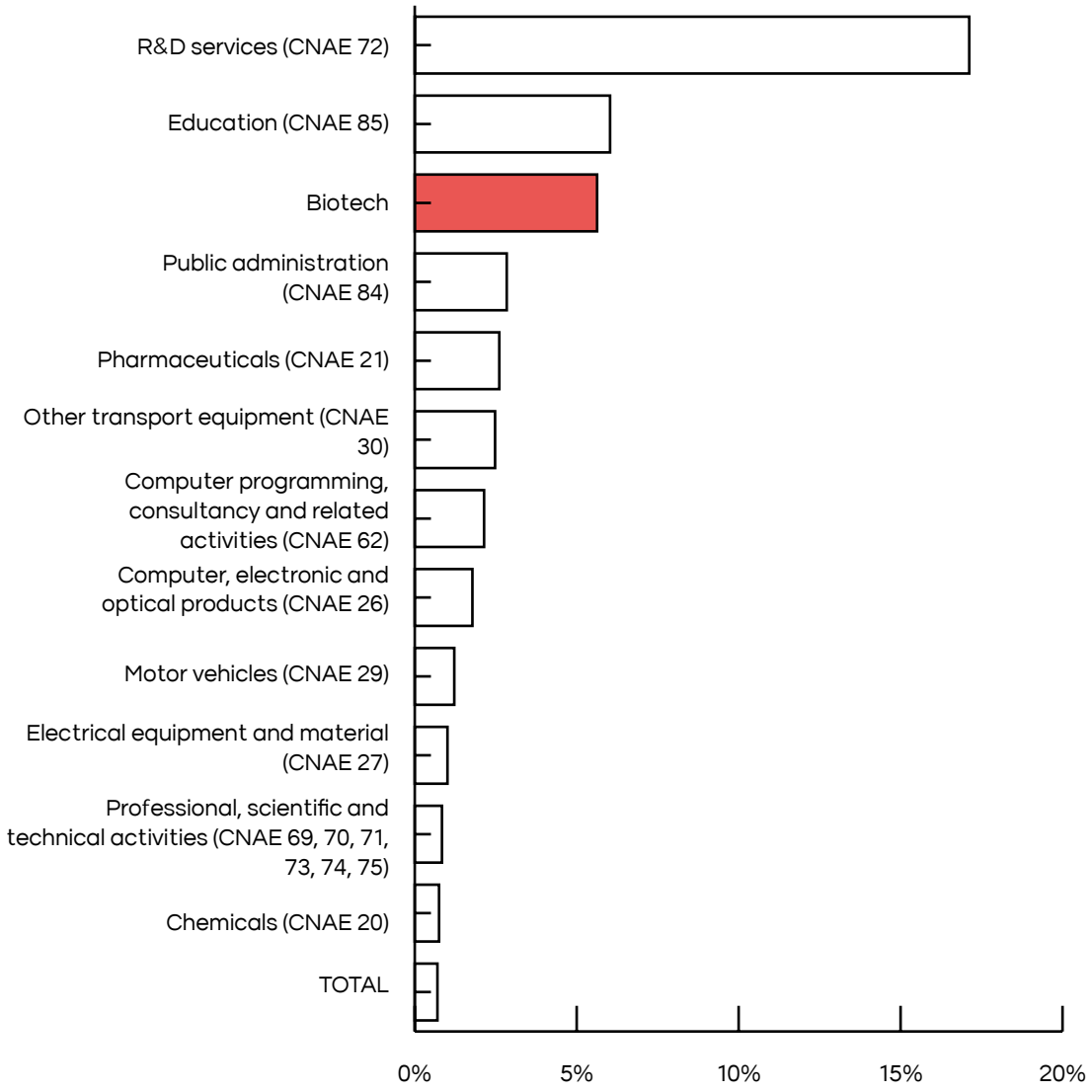
After six consecutive years of growth in R&D investment in biotechnology activities, 2019 set a record in absolute numbers and in growth rate, with investment up 22% over the previous year (graph 1.2). Specifically, strictly biotechnology firms have nearly doubled their investment over the past 10 years. In 2009, R&D investment was €344 million while in 2019 it was over €671 million.



Graph 1.2.
Evolution of internal R&D expenditure (€ millions). Source: INE. Survey on Biotechnology Use.

Biotech companies continue to be ranked first for R&D investment, after services and the educational sector.

Biotech companies as a sector invest the most in R&D relative to production, with 5.63%, up 2% from 2018 and ahead of the pharmaceutical sector. Plus, only R&D services and education, both non-industrial sectors, lead biotech companies (graph 1.3).



Graph 1.3.
R&D investment intensity in 2019. (Percentage of production). Source: Compiled internally from the 2019 Survey on Biotechnology Use and Statistics on R&D activities. INE.

Biotechnology stands out among the sectors with the greatest growth in R&D: increasing 23.8% in biotech firms and 31.4% in companies with biotechnology as a secondary activity.

In terms of the increase in R&D investment, strictly biotech companies are ranked fourth, surpassed only by arts, entertainment and recreation activities, companies with biotechnology as a secondary activity and companies dedicated to administrative and support services (graph 1.4).

Plus, compared to the average of 4.2%, biotech firms have seen much higher growth: 23.8%.

Graph 1.4.
Growth in R&D investment in 2019 (Year-on-year growth rate). Source: Compiled internally from the 2019 Survey on Biotechnology Use and Statistics on R&D activities. INE.

Sustainable innovation and industrial fabric for a healthier, more resilient society

Merck is a leader in science and technology with over 350 years of experience in innovation, strongly focused on health. Through its network of 58,000 professionals in 66 countries, the company strives for sustainable innovation to have a real impact on human progress and society's wellbeing through the most cutting-edge drugs and devices (Healthcare Division), tools for researchers to help accelerate scientific discoveries (Life Science) and technology for daily life for a more connected, more efficient world (Electronics).

Sustainable innovation, using science and technology as a tool, allows us to find answers to the great challenges facing society, reflected in the 2030 Agenda, in a way that is respectful of our surroundings. Merck is working to bring us closer to achieving SDG 3, to ensure healthy lives and promote wellbeing for all at all ages, through alliances (SDG 17) that get all the stakeholders in the innovation ecosystem involved. The search for a response to Covid-19 is a clear example of how accelerating scientific discovery collaboratively has a positive impact on everyone's health. Merck has worked with the University of Oxford's Jenner Institute to reduce vaccine-production times from 12 to two months. Plus, the 2021 Access to Medicine Index recognised the company as having shared more intellectual property than any other in the search for solutions to Covid-19.

Innovation is also facilitating the digital transition, a European goal that has a very significant impact on accelerating scientific discovery. The Synthia™ software, for example, compiles and analyses decades of research to identify and advance development of promising treatments.

Additionally, through the Mellody programme, Merck and nine companies in the sector share data to accelerate research and development with predictive models based on the largest database of known molecules, making drug discovery more efficient.

Innovation is also achieved through knowledge transfer. Merck's experience and structure allows it to be involved throughout the innovative process and have the infrastructure to generate value in projects with third parties through a global network of Innovation Hubs and support for scientific transfer. In Spain, Merck has a local Innovation Office (Fast Forward), which focuses on developing talent and finding opportunities to improve the lives of millions of people by identifying sustainable, scalable solutions that address society's challenges.

Merck also focuses on innovation by facilitating the development of personalised medicine with novel prevention and treatment strategies to fit each individual. The company focuses on three areas: oncology, immuno-oncology and neurology, researching patient-orientated treatment options that also contribute to the sustainability of the system. In Spain, this commitment is also an inherent part of clinical studies at hospitals in the National Health System in these therapeutic areas.

In addition to sustainable innovation, Europe, with the Next Generation EU funds, the European industrial strategy, the Green Deal and the drive towards the circular economy, is committed to a solid, sustainable industrial sector for tackling future healthcare emergencies and for fuelling the economy. Merck has 18 research and manufacturing sites for essential and biotechnology drugs, 13 of which are in Europe and three in Spain. Millions of euros are invested in these sites to ensure they are on the cutting edge of technological development and innovation.

This enabled us to supply to over 85 million patients during the pandemic. In Spain, the Tres Cantos biotechnology plant exports 100% of the growth hormone it produces, covering the whole global market, and is responsible for manufacturing 80% of all hormones for fertility treatments.
From the site in Mollet del Vallès, the pharmaceutical plant supplies products to over 40 countries and the chemical plant is highly competitive in the global market, exporting most of what it produces.

The Spanish Ministry of Economy, Industry and Competitiveness Profarma programme to foster competitiveness in the pharmaceutical industry has highlighted the activity of Merck sites, lauding the consistent investment made in recent years, commitment to quality employment and technological development. These characteristics, along with the operational excellence of the production processes and their export capacity, are key to ensuring Merck's industrial model in Spain is sustainable. This commitment to industrial facilities and cutting-edge technology, with R&D development, is essential to sustainable economic recovery that will allow us to continue moving quickly towards achieving the 2030 Agenda.

Europe will emerge stronger than ever from this deep transformation under way as a result of the pandemic, with initiatives that firmly fuel innovation and re-industrialisation, two great tools to leverage a dynamic economy that helps achieve the global agenda.

Merck, through various initiatives, alliances and collaboration agreements, is part of that collective effort and of the new social pact that will be the basis for building the future for the coming generations.

FUNDING

02

FUNDING

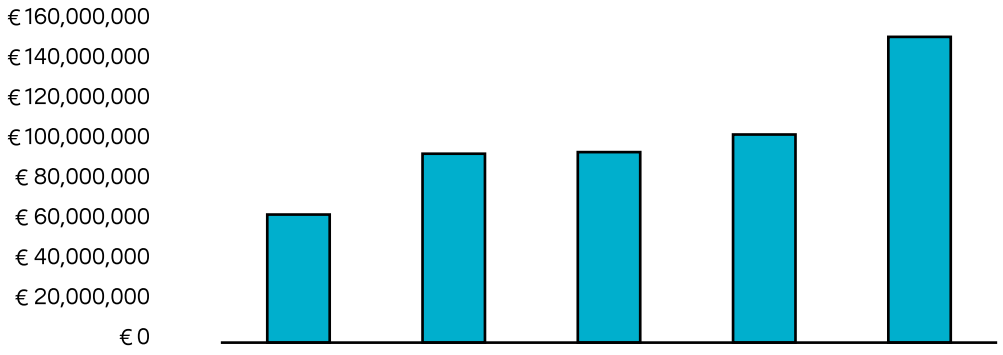
2.1 Private funding instruments

The private capital raised in the biotech sector rose 46% in the pandemic year.

Although 2020 was a year when most of the economy was put on hold due to the healthcare crisis, the Spanish biotechnology sector held investors' interest and saw the total volume of funding and number of operations increase again.

The total surpassed €150 million in 42 operations over the course of the year, with an average value of €3.6 million.

Comparing these figures to those from 2019, we see a 46.77% increase in the total volume. While 2019 first broke the €100-million barrier, this year it was over €150 million.



	2016	2017	2018	2019	2020
Total volume	€63,489,000	€93,764,444	€94,541,567	€103,315,800	€151,634,021
Average total per operation	€2,441,885	€3,472,757	€3,260,054	€3,228,619	€3,610,334
Number of operations	26	27	29	32	42

Graph 2.1. Evolution of private capital operations. Source: AseBio.

Ona Therapeutics, a company that specialises in the discovery and development of therapeutic biological products targeting cells that initiate tumour metastasis and lipid metabolism, had the largest round, with €30 million. The investors in this capital increase were Asabys Partners, Alta Life Sciences, Ysios Capital and French fund Bpifrance.

Four operations surpassed the €10-million mark, in addition to Ona Therapeutics: Highlight Therapeutics, with €22.6 million from British fund Advent Life Science, Spanish fund Columbus and the CDTI Innvierte instrument; MedLumics, with €18 million from Spanish participants Asabys Partners and Caixa Capital Risc, Italian fund Innogest Capital, Swiss fund VI Partners Swiss Innovation, French fund Andera Partners, French/German fund Kurma, and the CDTI co-investment fund Innvierte; Peptomyc with €11,4 million with Aurora Science, Alta Life Science, HealthEquity and CDTI Innvierte. Plus, Accure Therapeutics, which develops drugs to treat patients with diseases of the central nervous system, raised €7.6 million through CDTI Innvierte and Alta Life Sciences.
For its part, Arthex Biotech raised €7.4 million through CDTI Innvierte, Spanish fund Invivo Ventures and French fund Advent France Biotechnology.

The CDTI co-investment vehicle Innvierte kicked off in 2019 as a new initiative to leverage capitalisation of innovative Spanish technology-based companies.
This instrument accompanies private professional investors in rounds of funding, investing jointly. In the two years since it was launched, this instrument has invested in 19 biotechnology companies with a total of €4.4 million paid out in 2019 and €23 million in 2020. In terms of the amount committed, in 2019 it was €19.2 million and in 2020, €15.8 million.

Organisation	Investors participating in the investment	Instrument	Total volume committed (€)
Ona Therapeutics	Asabys Partners / Alta Life Sciences / Bpi-france / Ysios Capital	Capital increase	30,000,000
Highlight Therapeutics	Columbus Venture Partners / Advent Life Science / CDTI Innvierte	Capital increase	22,600,000
MedLumics	Asabys Partners / VI Partners Swiss Inno-vation / CDTI Innvier-te/ Andera Partners /Caixa Capital Risc / Innogest Capital / Kurma	Capital increase	18,000,000
Peptomyc	Aurora Science / Alta Life Sciences / HealthEquity / CDTI Innvierte	Capital increase	11,400,000
Accure Therapeutics	Alta Life Sciences / CDTI Innvierte	Capital increase	7,600,000
Algenex	MasterLux / Columbus Venture Partners	Capital increase	7,400,000

Arthex Biotech	Invivo Ventures / Advent France Biotechnology / CDTI Innvierte	Capital increase	5,450,000
Telum Therapeutics	Invivo Ventures / Clave Capital / CDTI Innvierte	Capital increase	4,100,000
Oxolife	CDTI Innvierte / Inveready	Capital increase	3,800,000
DeepULL	Alta Life Sciences / Kurma Partners / Sofimac Innovation	Capital increase	3,500,000
GENincode	Maven Capital Partners / Downing	Capital increase	3,400,000
OneChain Immunotherapeutics	Invivo Ventures / CDTI Innvierte / Josep Carreras Leukemia Foundation	Capital increase	3,050,000
Ability Pharma	SciClone / CDTI Innvierte	Capital increase	2,500,000
Made of Genes	FCV Equity / Break Off Capital / Scale Lab Andorra	Capital increase	2,400,000
Apta Targets	Inveready / CDTI Innvierte	Capital increase	2,300,000
Origo Biopharma	Asabys Partners / Xesgalicia / Partners	Capital increase	2,300,000
Pulmobiotics	Invivo Ventures	Capital increase	2,000,000
Connecta Therapeutics	Inveready / CDTI Innvierte / Founding partners	Capital increase	1,700,000
Archivel Farma	Partners	Capital increase	1,627,000
Telomere Therapeutics	Invivo Ventures	Capital increase	1,500,000
Gyala Therapeutics	Invivo Ventures	Capital increase	1,500,000
A4Cells	BeAble Capital / CDTI Innvierte	Capital increase	1,200,000
Histocell	Partners	Capital increase	1,060,000
VIVEbiotech	CDTI Innvierte	Capital increase	1,000,000
Qrem	Inveready / Business angels	Capital increase	1,000,000
Oncoheroes Biosciences	Dreamers Startup Ventures	Capital increase	1,000,000
InnoUp Farma	Current partners / CDTI Innvierte	Capital increase	1,000,000
ADmit Therapeutics	Ship2B / GENESIS Venture / WA4STEAM / ADDF	Capital increase / Convertible loan	610,000
Gate2Brain	Mind the Gap Transferencia Tecnológica / BStartip10	Capital increase	600,000
Match Biosystem	Clave Capital / BHV Partners	Capital increase	550,000
Amadix	CRB Inverbio / CDTI Innvierte	Capital increase	532,000

Vaxdyn	Mind the Gap Transferencia Tecnológica	Capital increase	500,000
Nucaps Nanotechnology	CNTA / University of Navarra / UN I+D+i Tech transfer	Capital increase	400,000
Genbioma	Clave Capital	Capital increase	400,000
Neurofix	Private investors	Capital increase	318,021
AntalGenics	CDTI Innvierte	Capital increase	280,000
Microbial Biosystems	BeAble Capital	Capital increase	165,000
Limno Pharma	Various investors / Genesis Ventures	Capital increase	126,000
Crazy Science & Business	Private investors	Capital increase	20,000
Recovid	Columbus Venture Partners	Capital increase	18,000
	Other operations		2,728,000

Table 2.1.
Private capital increases in Spanish biotechnology companies in 2020. Source: AseBio and ASCRI.

Spanish biotechnology remains on international investors' radar.

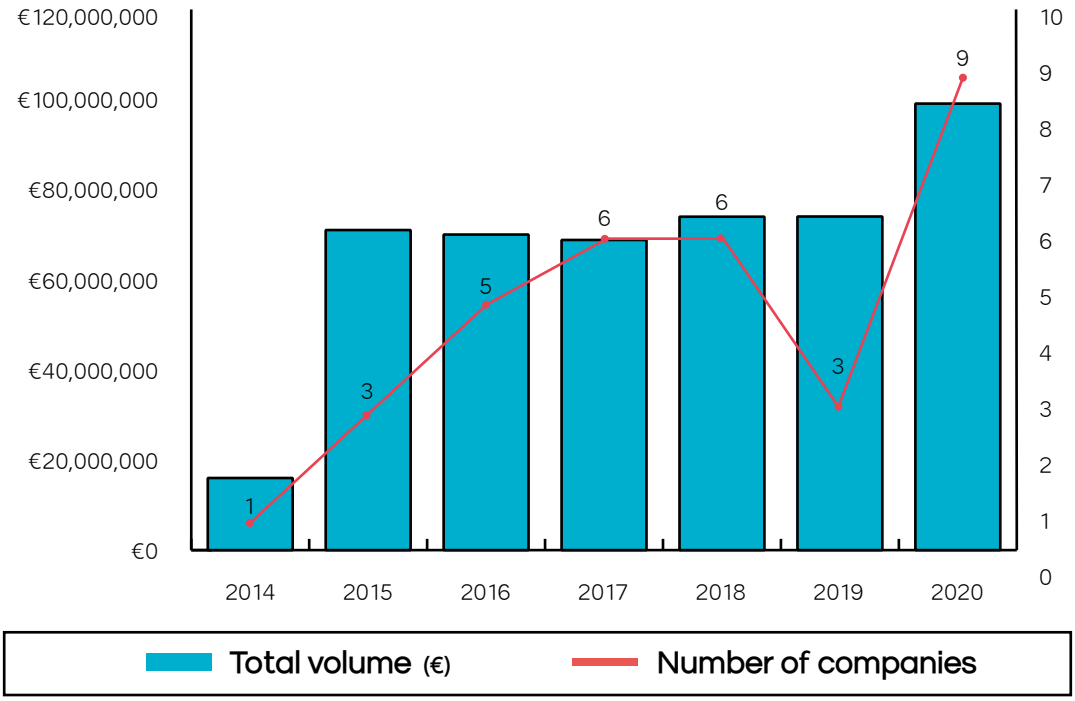
Both the volume of operations with international investors and the number of companies receiving funds from international investors rose again in 2020.

Nine companies attracted funding from investors in Switzerland, France, Italy, Germany, the United Kingdom, China and Andorra, with a joint total, including participation of Spanish funds, of nearly €100 million.

Ona Therapeutics	Asabys Partners	Spain	30,000,000
	Alta Life Sciences	Spain	
	Bpifrance	France	
	Ysios Capital	Spain	
Highlight Therapeutics	Columbus	Spain	22,600,000
	Advent Life Sciences	United Kingdom	
	CDTI Innvierte	Spain	

MedLumics	Asabys Partners	Spain	18,000,000
	VI Partners Swiss Innovation	Switzerland	
	CDTI Innvierte	Spain	
	Andera Partners	France	
	Caixa Capital Risc	Spain	
	Innogest Capital	Italy	
	Kurma Partners	France and Germany	
Peptomyc	Aurora Science	Italy	11,400,000
	Alta Life Sciences	Spain	
	HealthEquity	Spain	
	CDTI Innvierte	Spain	
Arthrex Biotech	Invivo Ventures	Spain	5,450,000
	Advent France Biotechnology	France	
	CDTI Innvierte	Spain	
DeepULL	Alta Life Sciences	Spain	3,500,000
	Kurma Partners	France and Germany	
	Sofimac Innovation	France	
GENinCode	Maven Capital Partners	United Kingdom	3,400,000
	Downing	United Kingdom	
Made of Genes	FCV Equity	Spain	2,400,000
	Break Off Capital	United Kingdom	
	Scale Lab Andorra	Andorra	
Ability Pharma	SciClone	China	2,300,000
	CDTI Innvierte	Spain	

Table 2.2. Private capital increase operations with international investors, 2020. Source: AseBio.



Graph 2.2.
Evolution of volume of private capital increase operations with international investors (2014 - 2020)
Source: AseBio.

Funds raised on capital markets are up 35%.

Table 2.3 shows the operations by biotechnology companies traded on either the BME Growth or the Spanish Continuous Market. Throughout 2020, there were four capital increases by issuing new shares, carried out by biotechnology companies Reig Jofre, Oryzon and Atrys Health, raising over €70 million, up 35% from 2019.

	2016	2017	2018	2019	2020
Evolution of capital increases by publicly traded companies	€20,522,889	€41,345,199	€38,200,000	€52,144,440	€70,369,911

Organisation	Type of capital increase	Total volume committed (€)
Atrys Health	Capital increase by issuing shares	35,000,000
Atrys Health	Capital increase by issuing bonds	15,000,000
Oryzon Genomics	Capital increase by issuing shares	20,000,000
Reig Jofre	Capital increase by issuing shares	369,911

Table 2.3.
Capital increase by companies traded on the Spanish Alternative Stock Market or Continuous Market Growth.
Source: AseBio.

Acquisition operations continue at Spanish biotechnology companies.

Atrys Health, a company specialising in precision diagnostics with molecular and pathological anatomy, diagnosis using online imaging, and oncological radiotherapy, acquired three other companies in 2020: Axismed, ICM and ITMS. Plus, Vidaro Inversiones acquired part of Pangaea Oncology, a company traded on the BME Growth, and Plant Response acquired 100% of Pathway BioLogic.

As is common with this sort of operations, the amounts of those transactions were not made public.

Funding through loans and equity shares held by business development bodies dropped and the participation of international financial institutions was notable.

This complementary funding is obtained by biotechnology companies through loans or equity shares held by regional or national business development bodies.

These are regional financial instruments, like participation loans and venture capital, or loans granted by ENISA, a public company under the Ministry of Industry, Trade and Tourism.

In 2020, both the volume and number of loan operations and participations in the sector dropped. The total volume was over €3 million in a total of 12 biotechnology companies.

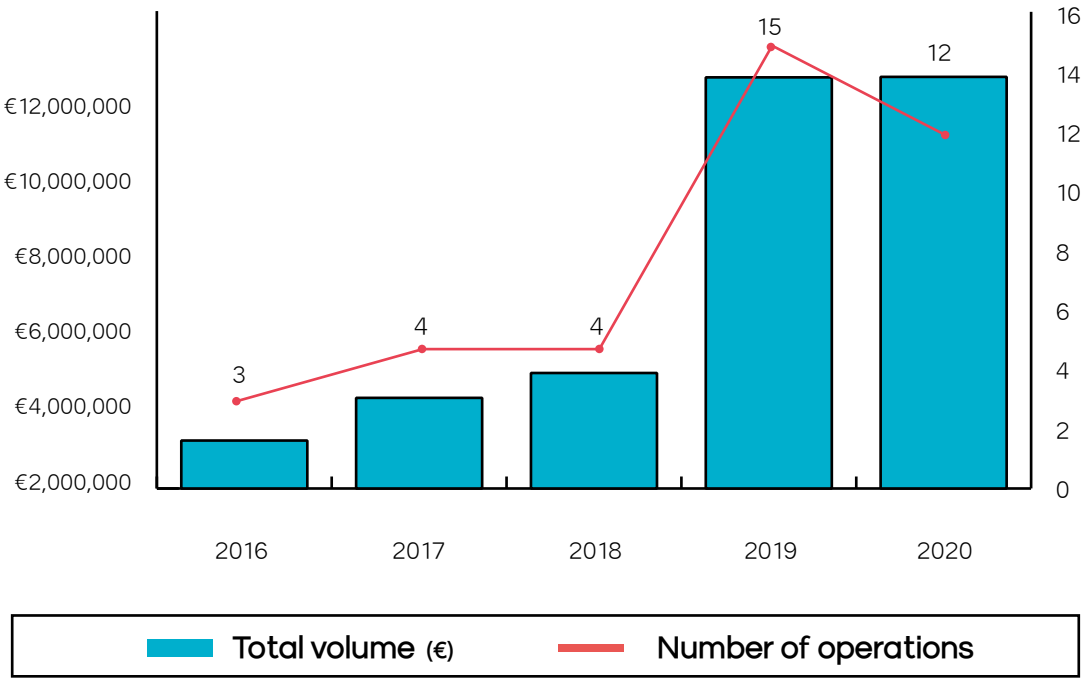
Nevertheless, this year other financial institutions stand out, such as the European Investment Bank, the lending arm of the European Union that grants loans for investments that help achieve the goals of the European Union or other types of institutions. In 2020, the European Investment Bank granted a total of €47.5 million in loans to Spanish biotechnology companies Minoryx, Ability Biopharma and Sanifit. Plus, Vaxdyn received non-dilutive funding from the Boston-based accelerator Combating Antibiotic Resistance Bacteria.

	2016	2017	2018	2019	2020
Total volume international organisations (€)					47,500,000
Number of international operations					4
Total volume national organisations (€)	7,695,000	10,868,204	3,715,155	5,584,000	3,064,000
Number of national operations	33	31	22	27	12
Average total per national operation (€)	233,182	350,587	168,871	206,815	255,333

Table 2.4. Evolution of loans granted by ENISA and by regional societies in 2020. Source: AseBio and ENISA.

Crowdfunding holds steady in Spanish biotechnology sector.

In 2020, crowdfunding saw the same figures as in 2019, as a funding option for the biotechnology sector. In 2020, the 12 companies that opted for this source of funding raised more than €10 million for the second year in a row. As graph 2.3 shows, since the first biotechnology companies started using this funding instrument in 2016, this path has grown considerably, peaking in 2019 and 2020.

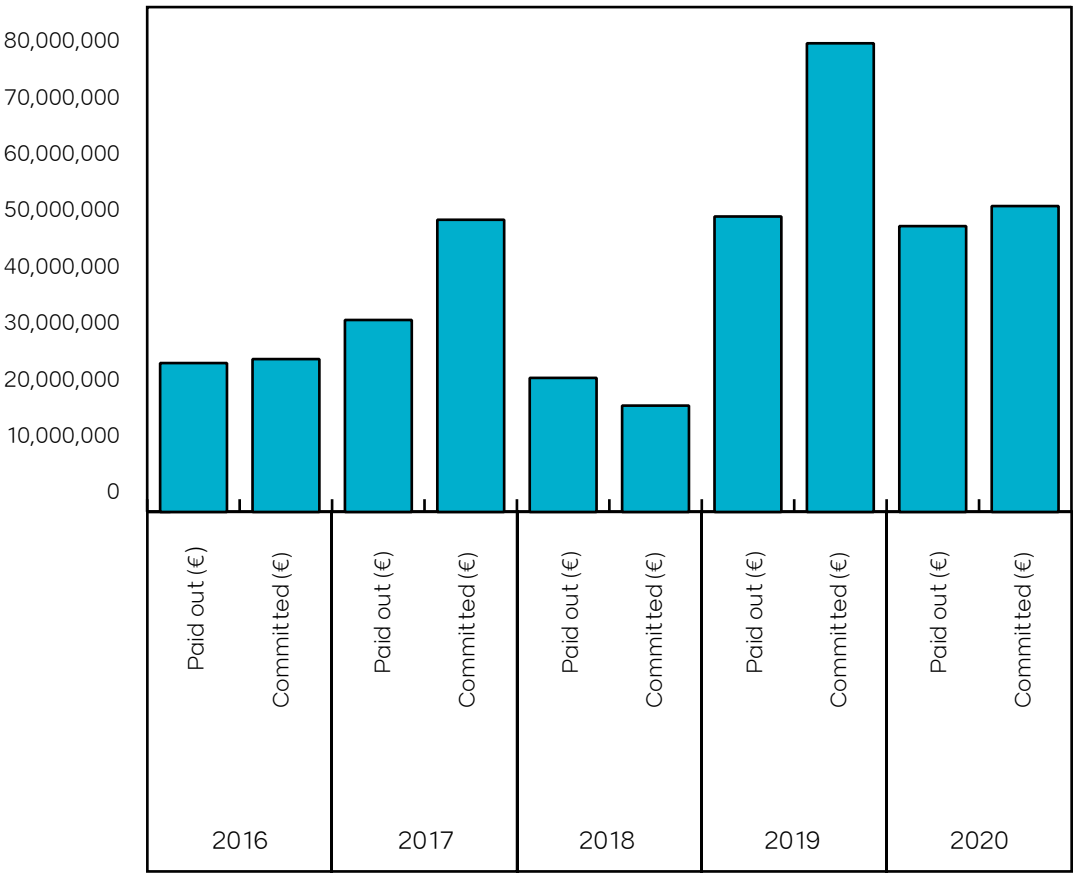


Graph 2.3.
Evolution of crowdfunding operations by biotechnology companies. 2016 - 2020. Source: AseBio.

Venture capitalists continue banking on Spanish biotechnology companies.

In summer 2020, Ysios Capital announced its third fund, Ysios BioFund III, endowed with €155 million. This third fund comes after BioFund II, with €126 million, and BioFund I, with €65 million.
This fund will invest in up to 15 companies that are developing disruptive therapeutic products, among others.

Plus, according to the analysis AseBio has been carrying out since 2016, the amount invested by venture capitalists in Spanish biotechnology companies held steady in 2020, although there was a drop in the amount committed.
CRB, Caixa Capital Risc, Ysios Capital, Inveready, Invivo, Clave, Columbus, Alta Life Sciences and Asabys paid out over €45 million in 2020 and committed €48.5 million to be paid out in the future. While the amount paid out only dropped 3%, the volume committed fell 35% from 2019.



Graph 2.4.
Evolution of volume paid out and committed. 2016 – 2020. Source: AseBio.

2.2 Public funding instruments

In addition to private instruments, the biotechnology sector also turns to public grant programs, including those run by the Centre for the Development of Industrial Technology (CDTI) and the State Research Agency (AEI). Now let's look at the analysis of how CDTI grants for R&D projects have evolved in the biotechnology sector since 2012, and those awarded by the AEI State Program for Research, Development and Innovation since 2014.

R&D projects and Neotec grants supported by the CDTI in the biotechnology arena.

The CDTI supports business projects for applied industrial research and experimental development to create or significantly improve a production process, product or service, submitted by one or a group of companies. In the innovation arena, it supports projects close to market that help boost the company's competitiveness by incorporating emerging technology in the sector.

Neotec subsidies are intended to fund new technology-based companies, which are those whose main activity is to exploit products or services that require the use of technology or knowledge developed through research activity.

In 2020, 71 projects in biotechnology were funded, including projects for individual and cooperative R&D, LIC-A, FEMP, Science and Innovation Missions Programme, ERA- NET and Eurostars, eight projects in biotechnology under the Neotec grants and 18 R&D projects related to the Covid-19 healthcare emergency.

	Number of projects	Total budget (€)	Total awarded (€)	Non-repayable portion / Grant (€)	Repayable portion (€)
R&D projects approved in the biotechnology arena.	71	48,359,683	36,619,406	20,157,863	24,979,608
R&D projects approved related to the Covid-19 healthcare emergency	18	12,743,913	10,070,338	4,821,745	
Neotec grants	8	2,979,446	1,946,109	1,946,109	
Total	**89**	**64,083,042**	**48,635,853**	**26,925,717**	**24,979,608**

Table 2.5.
R&D projects approved in the biotechnology arena in 2020. Source: CDTI.

Evolution of projects funded by the CDTI in the biotechnology arena.

Analysis of the evolution of funding for CDTI projects between 2012 and 2020 looks at the biotechnology R&D projects approved for funding through repayable and partially repayable aid each year.

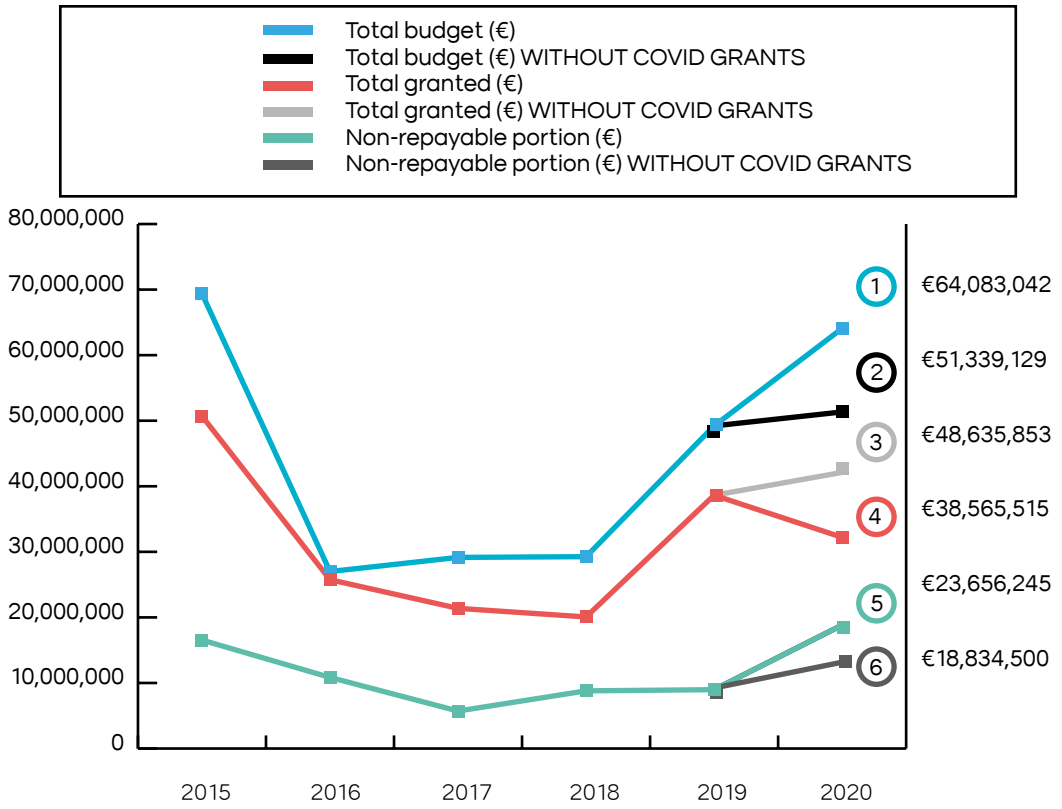
Both the total budget, amount granted and number of projects approved increased again in 2020. The total budget was up 30%; the amount granted, 26%; and the number of projects, 19%. The non-repayable portion, meaning the amount awarded in grants, increased 164%, going from nearly €9 million in 2019 to €23.6 million in 2020.

If we look at these figures without the grants through the emergency calls resulting from the Covid-19 situation, the growth isn't as spectacular. Regarding the total budget, the increase would be 4%; the amount granted, practically unchanged; the number of projects, up 5%; and the amount granted, up 110%.

	2012	2013	2014	2015
Total budget (€)	€54,574,672	€38,130,273	€38,667,929	€69,379,626
Total awarded (€)	€40,591,923	€29,090,636	€30,954,425	€50,701,328
Non-repayable portion (€)	€4,267,112	€2,524,403	€5,469,468	€16,543,458
Repayable portion (€)	€35,555,612	€25,845,101	€24,634,085	€34,157,869
Number of projects	72	62	44	46
% NRP vs. Granted	11%	9%	18%	33%

2016	2017	2018	2019	2020
€26,997,606	€29,153,878	€29,263,359	€49,209,769	€64,083,042
€25,751,881	€21,382,075	€20,069,625	€38,635,449	€48,635,853
€10,848,637	€5,719,520	€8,797,848	€8,976,247	€23,656,245
€14,903,244	€15,662,555	€11,271,777	€26,315,918	€24,979,608
29	42	57	75	89
42%	27%	44%	23%	49%

Table 2.6. Evolution of R&D projects approved in the biotechnology arena. Source: CDTI.

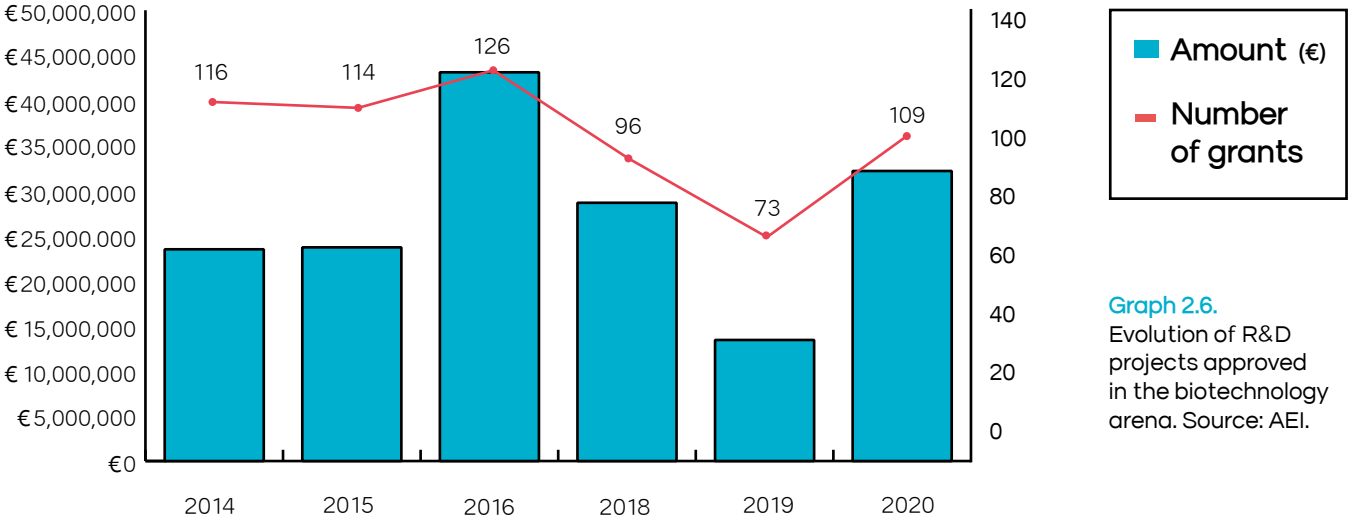


Graph 2.5.
Evolution of R&D projects approved by CDTI in the biotechnology arena. Source: CDTI.

Evolution of projects funded by the Spanish State Research Agency (AEI) in the biotechnology arena.

Graph 2.6 shows the evolution between 2014 and 2020 of the number of grants and the total amount granted by the AEI in the biotechnology sector. These grants fall under the State Programme for Knowledge Generation and Scientific and Technological Strengthening of the R&D&i System, the State R&D Programme Oriented to the Challenges of the Society and the call for R&D Projects.

As graph 2.6 shows, in 2020 there was a considerable increase in both the number of grants, 36 more, and the total amount granted, up 146%.



Graph 2.6.
Evolution of R&D projects approved in the biotechnology arena. Source: AEI.

TALENT AND DIVERSITY

03

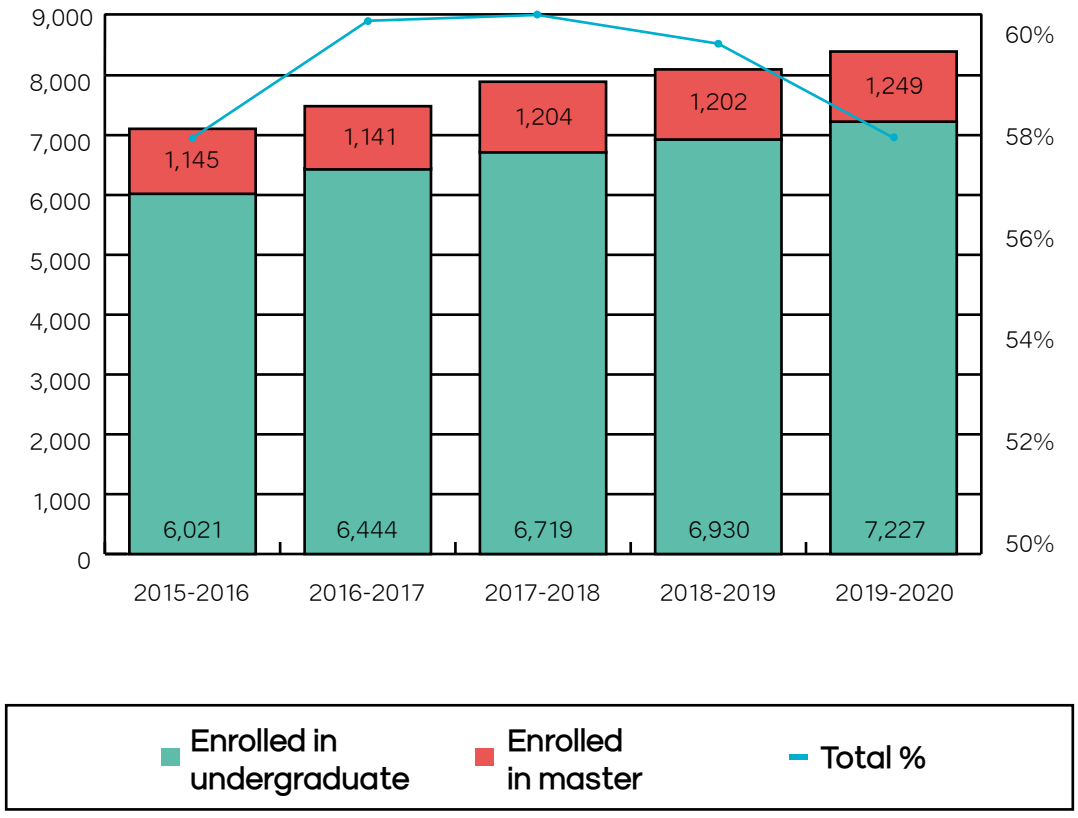
TALENT AND DIVERSITY

Biotechnology continues to attract young students, particularly women.

Students' interest in biotechnology studies increases each year. Since 2015, the number of students enrolled in university studies in biotechnology, both undergraduate and master's level, has increased every year.

The latest data, for the 2019-2020 school year, shows over 7,200 students.

Of these 7,200 students, women make up roughly 60% of those enrolled in these programmes. This percentage has held steady since the 2015-2016 school year (graph 3.1).

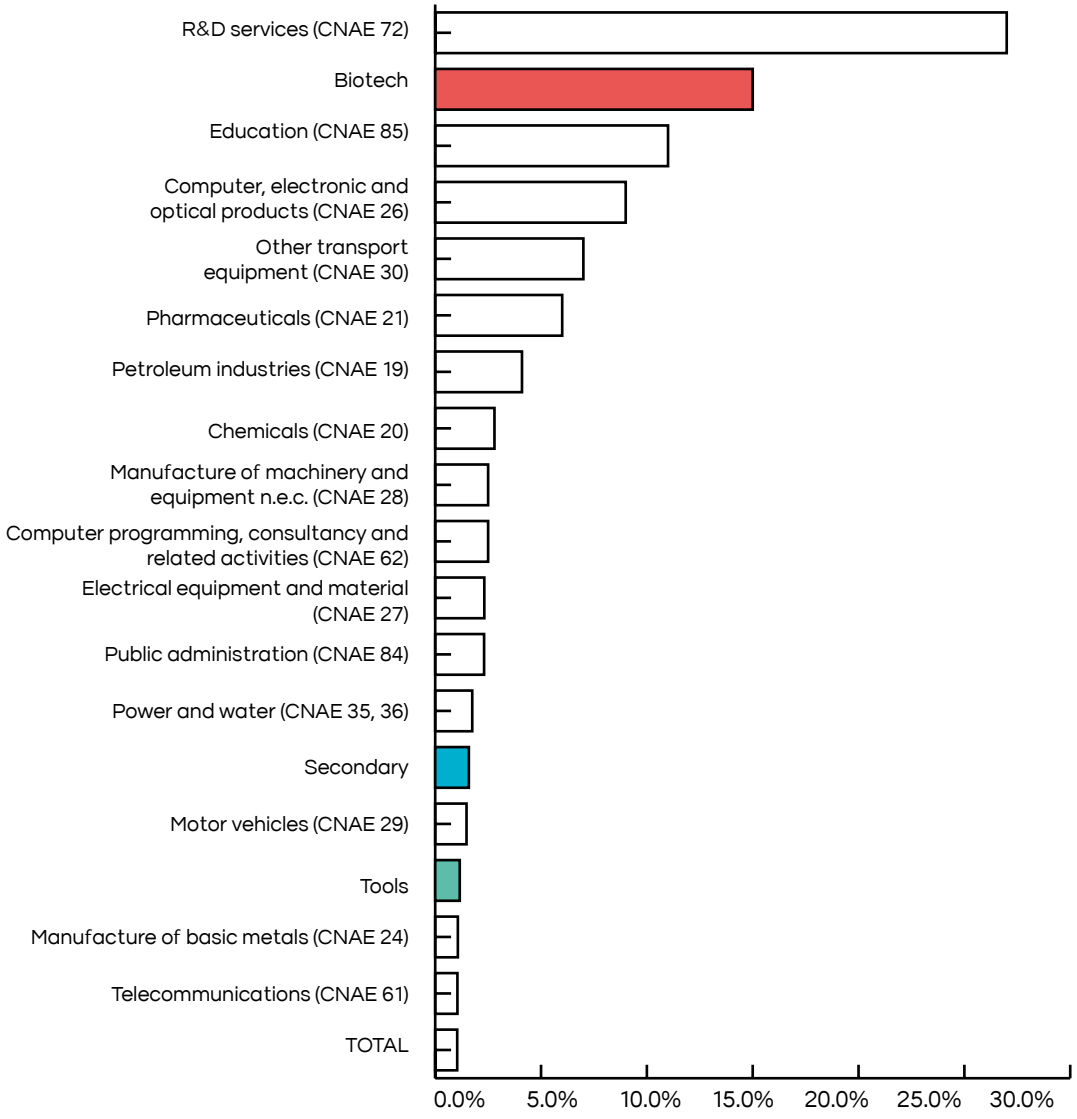


Graph 3.1.
Evolution of number of students enrolled in university studies in biotechnology (undergraduate and master). Source: Compiled internally from Statistics on University Students of the Ministry of Science, Innovation and Universities.

Plus, biotechnology remained among the degrees that require the highest marks on university entrance exams in 2020. At 19 of the 24 public universities that offer biotechnology studies, this degree is among the top 10 highest entrance scores required. The same is true of the dual degrees that include biotechnology with related disciplines like pharmacy, molecular biology, engineering, etc., which have recently been created at public universities and are, on average, among the top four highest entrance scores. We also find this in degrees that are directly related, such as biomedical engineering, which has the highest entrance score at 10 out of the 14 public universities with a programme in this field.

The biotechnology sector has a greater percentage of researchers to employees than any other.

Biotech companies have the highest percentage of researchers to total employees in the sector, surpassed only by R&D services companies, with researchers making up 15.45% of all employees.



Graph 3.2.
Ratio of researchers to total employees. Source: Compiled internally from the 2019 Survey on Biotechnology Use and Statistics on R&D activities. INE.

Training and innovative technology to drive the biotechnology sector in Spain

Technological progress in the 21st century is advancing at the speed of light. This is particularly true in the life sciences, where huge breakthroughs have been made in genomics, proteomics and other 'omics', gene editing, computational biology, modelling and artificial intelligence. These technologies are essential to opening up new paths and carrying out cutting-edge research and innovation, despite the fact that developing the skills needed and staying up to date is quite a challenge, especially for organisations and small or medium-sized companies.

Technology and training are part of the core missions of the Centre for Genomic Regulation (CRG) in Barcelona.

Our technology platforms and science/technology services give CRG scientists access to costly, sophisticated technology, as well as providing cutting-edge science services to the international scientific community and the pharmaceutical and biotechnology sector.
This facility attracts researchers from different fields, both academic and industrial, with diverse skills, in all phases of their careers, to forge new collaborations.

The CRG training programme includes internal and international courses in science and technology. Our flagship courses, the Courses@CRG, are advanced classes with an international scope on the latest trends in science and technology.
We launched our first course early in the past decade, inspired by the prestigious courses at institutions like Cold Spring Harbor in the US and the European Molecular Biology Organisation (EMBO). We currently offer several one-week international courses each year, which attract participants, speakers and instructors from the academic and business sectors.

Since the programme began, the courses have seen nearly 1,000 participants from 60 countries. We also travel outside of Spain and host courses on personalised medicine in Argentina, Brazil and South Africa, in collaboration with international universities and private companies.

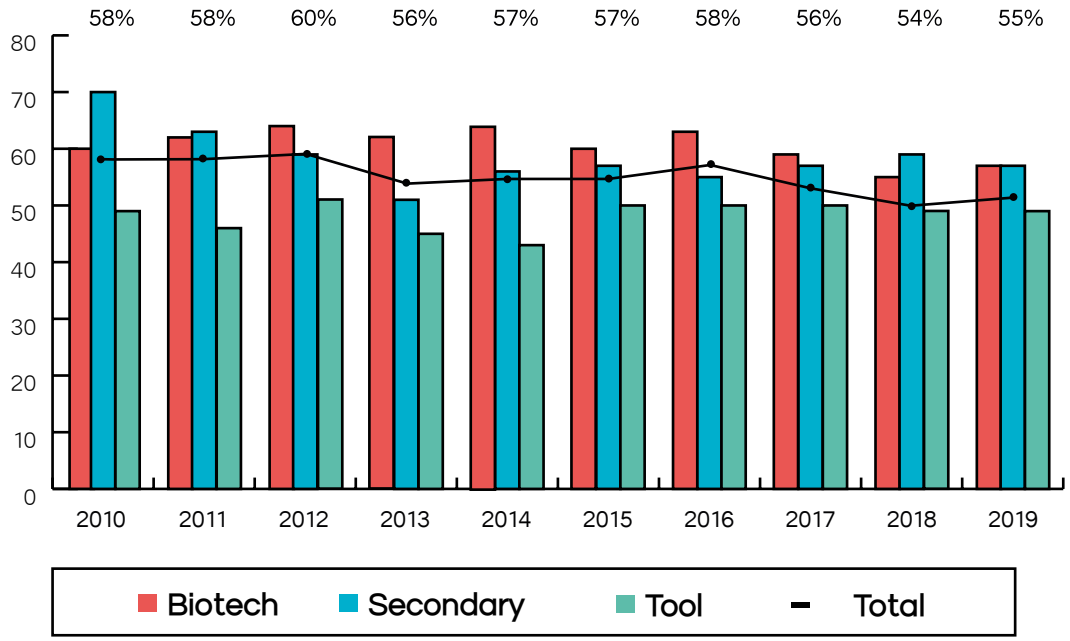
We combine theory lectures with experimental and computational practical sessions in the lab, thanks to our centre's spaces dedicated exclusively to training.
One important goal of the Courses@CRG is to not only transfer knowledge on innovative technology, but also build communities of experts, who often continue working on collaborative projects after the course.
Our courses feature hackathons, jamborees and various gamified teaching activities to promote contact and sharing among the participants. In recent years, thanks to the digital environment, we have developed an online training platform that complements our in-person programme.

Our next goal is to develop and explore new collaborations with the biotechnology sector to identify its needs in technology and training, and develop attractive courses together for researchers from the academic and business sectors. Through technology and training, we believe it is possible to develop public-private partnerships to strengthen knowledge transfer from the academic to the business sector and vice versa, and together carry out exciting, innovative new projects.

Luis Serrano
Director of the Centre for Genomic Regulation

CRG
Centro de Regulación Genómica

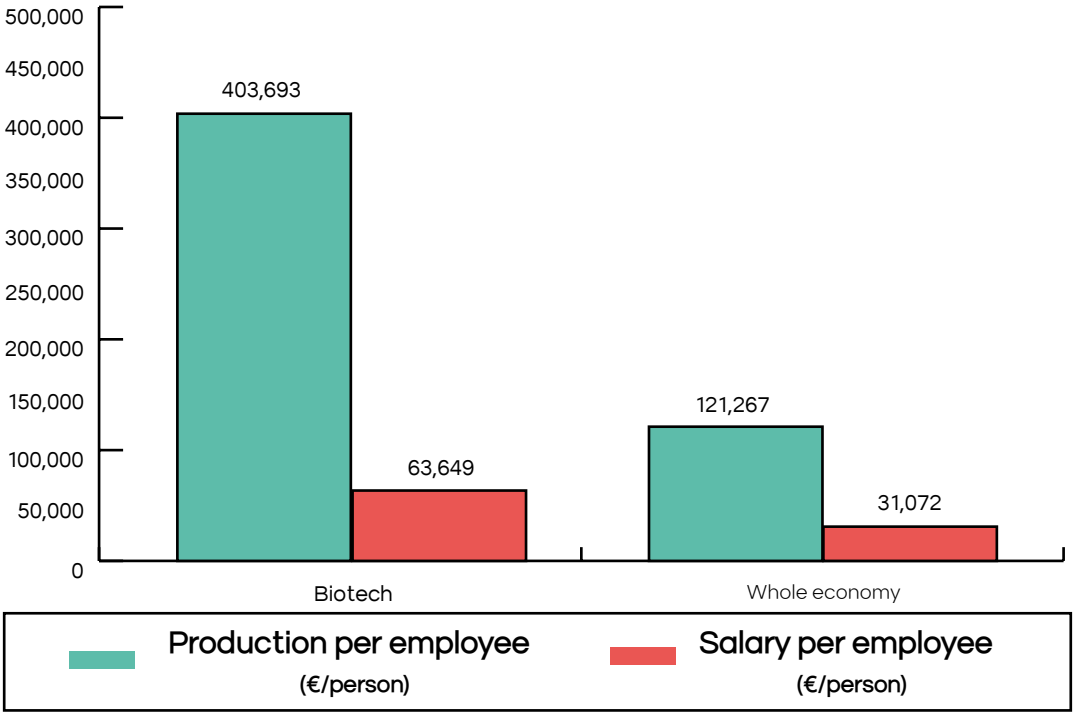
The percentage of researchers to total R&D personnel at biotechnology companies is 55% and has remained steady between 54% and 60% since 2010. Nevertheless, for biotech firms this percentage is even higher and for the same time period, has always been between 55% and 64%. This figure rose slightly in 2019, from 55% to 57%, as seen in graph 3.3.



Graph 3.3.
Evolution of the percentage of researchers to total R&D personnel.
Source: Compiled internally from Survey on Biotechnology Use. INE.

Productivity and salary per employee at biotech firms is more than double the national average.

Average productivity of biotech firms is more than €400,000 per employee compared to €121,000 on average for the Spanish economy as a whole, which also is reflected in average salaries that are more than double the national average (graph 3.4).

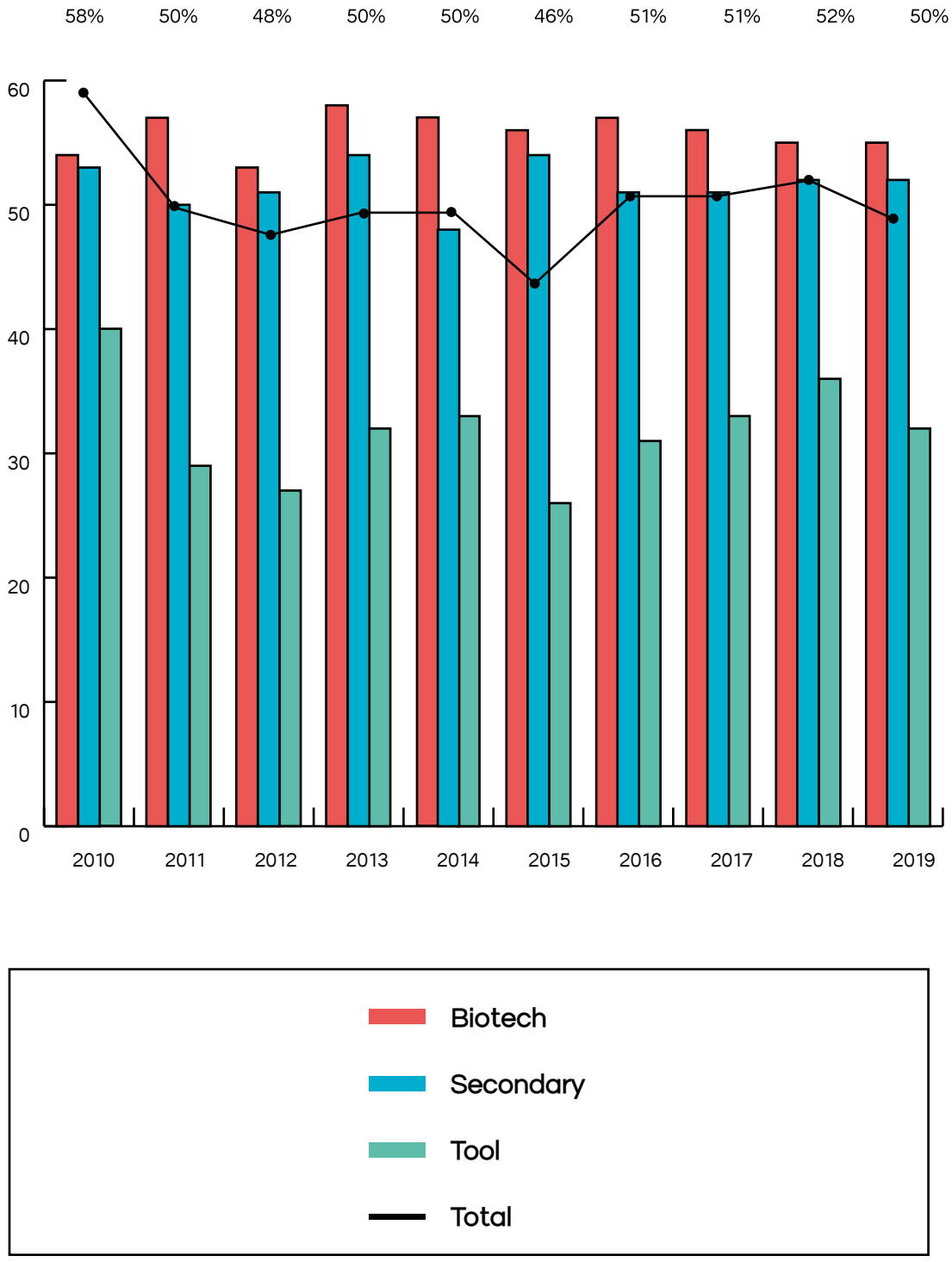


Graph 3.4.
Basic productivity and salary ratios for employees at biotech firms.
Source: Compiled from the information on companies collected by AseBio.

Biotech companies maintain leadership in female participation in R&D activities.

The percentage of women doing R&D work at biotech firms has held steady above 51% since2016.

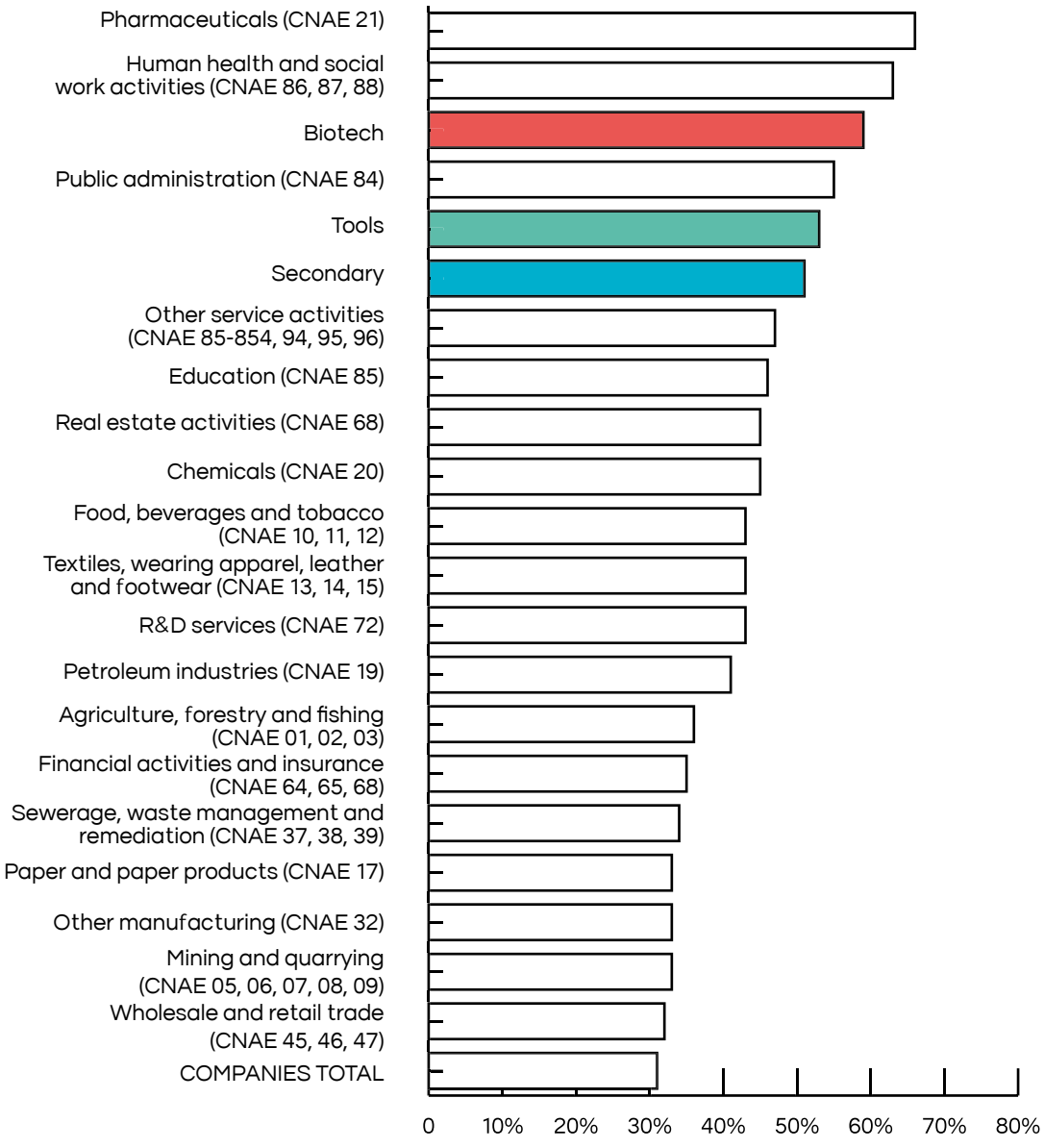
As graph 3.5 shows, for biotech companies the percentage of women has always been above 53% since 2012. In 2019, the figure held steady from 2018, with women making up 55% of employees.



Graph 3.5.
Evolution of women in biotechnology activities as a percentage of all employees:
Source: Compiled internally from Survey on Biotechnology Use. INE.

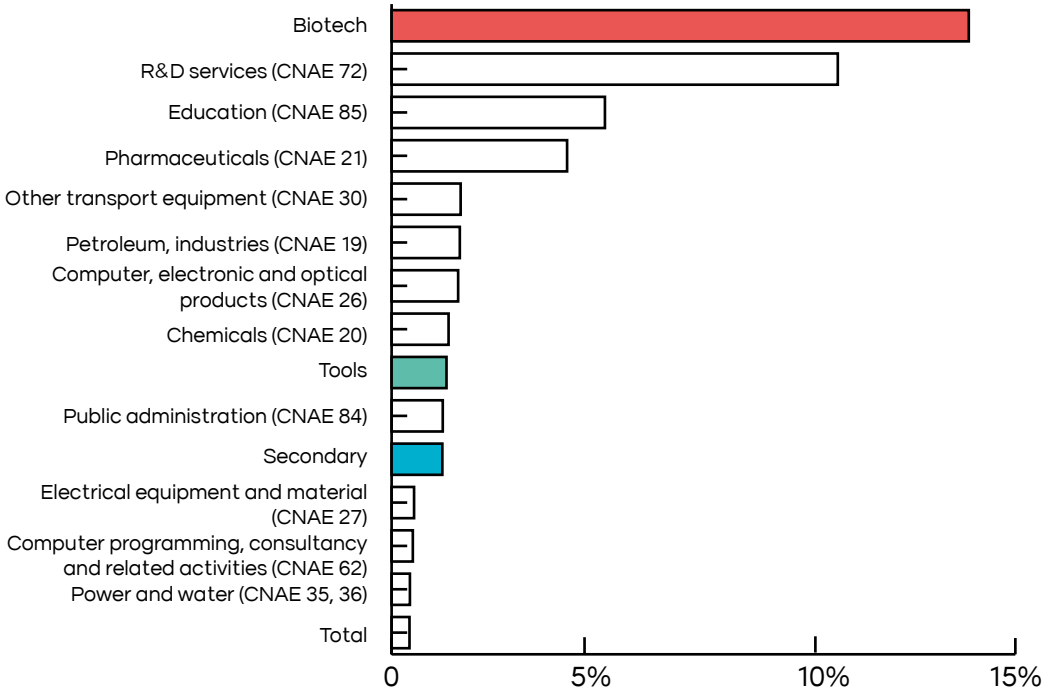
On the ranking of women doing R&D work, biotech companies are once again third, with 59%, well above the 31% average participation of women doing R&D work for the economy as a whole.

As we can see in graph 3.6, biotech firms are only surpassed by healthcare activities and pharmacy and social services.



Graph 3.6.
Percentage of women to total R&D personnel. Source: Compiled internally from the 2019 Survey on Biotechnology Use and Statistics on R&D activities. INE.

Biotech firms lead in the presence of female investigators, technicians and assistance, as a percentage of the total employment in all areas of activity. Nearly 14% of total employment (graph 3.6), for female researchers, and 7% for female technicians and assistants, both well above the national average of 0.43% and 0.24% respectively and well above sectors like pharmaceuticals and chemicals.



Graph 3.7.
Ratio of female researchers to total employment in 2019 (percentage of female researchers to total employees). Source: Compiled internally from the 2019 Survey on Biotechnology Use and Statistics on R&D activities. INE.

Women make up 24.4% of executive teams at biotech firms, well above the average of 2.9% for IBEX-35 companies.

Despite the positive figures for female participation in the biotechnology sector, women only hold 18.5% of CEO positions and 24.4% of executive management positions.

Although this percentage is still low, it is significantly higher than the average for IBEX-35 companies, and above other sectors like pharmaceuticals, where 21.5%1 of executive management positions are held by women.
In biotech companies, the percentage of women on the management team is over 31%, nearly 10 points above the figure for IBEX companies (table 3.1).

[1] 2017 Farmaindustria Employment Survey

Table 3.1.
Female presence in management teams at biotech companies in 2019. Source: Compiled internally from the Companies House registry and companies' websites. (*) Data from the INE and Institute of Women. Ministry of Equality.

	% Women	
	Biotech	IBEX-35(*)
President	18.5%	2.9%
Executive management	24.4%	2.9%
Executive teams	31.4%	21.6%

Bioibérica: The responsibility of being the leading manufacturer of heparin in the world

Bioibérica is a global Spanish life sciences company committed to improving the health and wellbeing of people, animals and plants, with over 45 years in the business. The company specialises in identifying, extracting and developing biological molecules, which become high-quality products for the pharmaceutical, nutraceutical, veterinary, animal nutrition and agriculture industries.

This specialisation has made Bioibérica one of the leading companies in the world in manufacturing the active pharmaceutical ingredient heparin. The World Health Organisation (WHO) considers heparin an essential drug and, in fact, unfractionated heparin (UFH) and its low-molecular weight (LMWH) derivatives are the most commonly used group of anticoagulants for preventing and treating thrombosis around the world.
One in five doses of heparin administered in the world today is produced by Bioibérica.

The Covid-19 pandemic has been tragic in its effect on people's health and will have very worrying consequences for global economies. Some Covid-19 patients, particularly those in hospital and in the advanced stages of the disease, develop Venous Thromboembolism (VTE), a condition that includes deep vein thrombosis (DVT) and pulmonary embolism (PE).
VTE is an abnormal blood clot that forms in a deep vein, generally in the lower leg, thigh or pelvis.

A PE occurs when the clot detaches and travels through the blood to the lungs. Prophylaxis and treatment of VTE, due to any cause, is one of the main uses of heparin.

According to a study led by Dr Valentín Fuster, director of the National Centre for Cardiovascular Research and the Mount Sinai Heart Institute in New York, people in hospital due to Covid-19 who are treated with anticoagulants could have a better chance at survival. The study analysed six different anticoagulant options. **Of them all, low molecular weight heparin used therapeutically and prophylactically and therapeutic apixaban showed the best results.**

This observational study is an extension of the research published on 11 June 2021, which had studied nearly 3,000 patients with Covid-19. It showed that patients hospitalised due to Covid-19 and treated with anticoagulants improved significantly both in and out of the ICU. The study was based on the fact that many patients hospitalised with Covid-19 developed potentially deadly blood clots.

This anticoagulation therapy has been associated with a higher survival rate among these patients. Specifically, patients treated with anticoagulants had a nearly 50% greater chance of survival and approximately 30% less chance of having to be intubated than the patients who weren't given anticoagulants.

In 2020, Bioibérica celebrated the **45th anniversary** of its commitment to manufacturing the active pharmaceutical ingredient heparin, always to the very highest standards of quality and safety.

During this social and healthcare crisis, Bioibérica has remained true to our responsibility and commitment: to keep working to ensure production and distribution of heparin and all our active pharmaceutical ingredients with the very highest standards of quality and safety.

Bioiberica

BUSINESS FABRIC

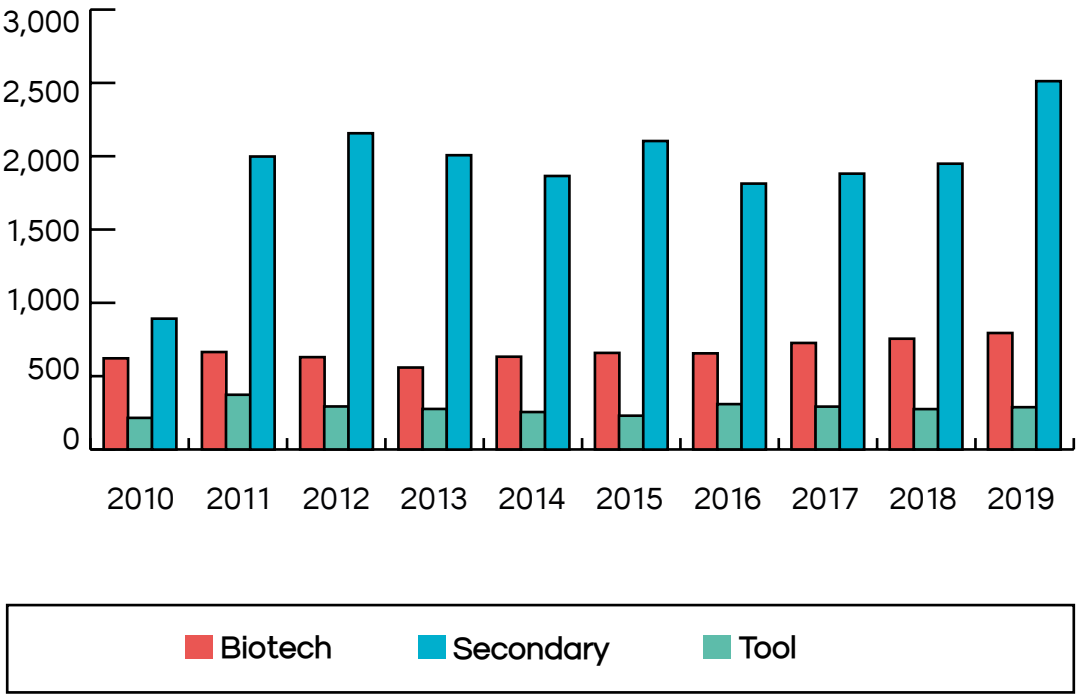
04

BUSINESS FABRIC

More than 3,500 companies carried out biotechnology activities in 2019, of which 790 are biotech firms

In 2019, the growth of the total number of companies working in biotechnology accelerated significantly, with the average growth up 20% from 2018, meaning over 600 companies incorporated this year.
Of this total, 790 are strictly biotechnology firms (graph 4.1).

This sharp increase, along with the slight drop in the total number of companies in all areas of activity, has pushed the ratio of biotechnology companies to an all-time high of 2.4 biotechnology businesses per 1,000 companies. By type, the largest increase was in companies that use biotechnology as a production tool, with nearly 29%, followed by biotech firms with 5.2% and secondary companies with 4.9%.

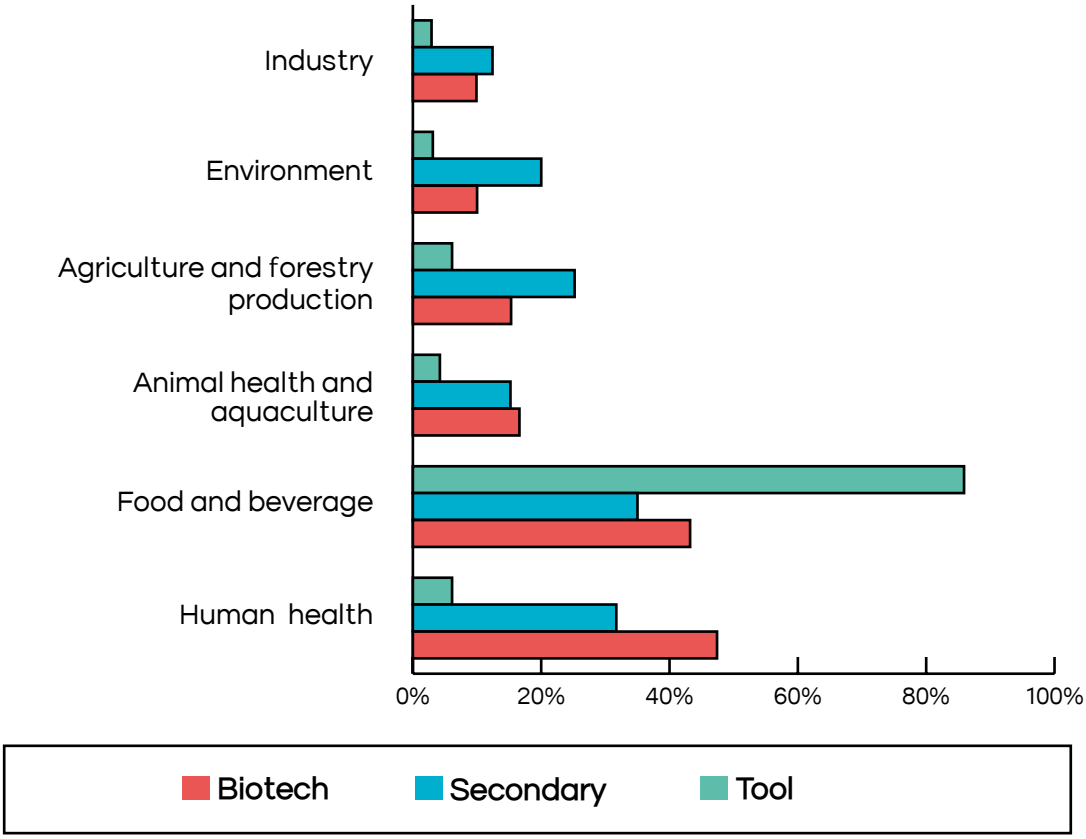


Graph 4.1.
Evolution of the number of biotechnology companies.
Source: Compiled internally from Survey on Biotechnology Use. INE. and AseBio lists.

Human health and food make up 90% of all fields of application in biotech firms

By field of application, biotech firms are concentrated in human health and food, making up nearly 90% of the total. Of this majority, it must be noted that 47% of companies that work exclusively in biotechnology focus on human health. (Graph 4.2).

This distribution pattern by fields of application is similar among companies with a secondary focus, although less concentrated, with 31% in human health and 35% dedicated to food. Companies working in agriculture and forestry, as well as the environment, now make up more than 45% of all companies with biotechnology as a secondary activity.
Finally, among companies that use biotechnology as a production tool, food is clearly a dominant focus, with over 85% of the total.



Graph 4.2.
Breakdown of biotechnology companies by field of application.
Source:
INE. 2019 Survey on Biotechnology Use.

55% of biotech firms are micro-SMEs and 45%, SMEs.

As we can see in table 4.1, the percentage of micro-SMEs to total biotech firms has decreased and the number of small and medium-sized companies and large corporations rose.
Roughly 51% of the 790 biotech companies are micro-SMEs with fewer than 10 employees and nearly 32% are small companies with fewer than 50 workers.
On the other hand, 14% are medium-sized companies with fewer than 250 and just over 3% are the 21 large corporations. This last group accounts for over 48% of the joint turnover of companies with biotechnology activity (table 4.1).

	Number of companies	% of total	Average turnover (€ millions)	% of total turnover
Micro-SMEs (fewer than 10 employees)	482	50.6%	0.4	1.6%
Small (10 to 49)	197	31.6%	5.4	9.2%
Medium (50 to 249)	90	14.4%	53	41.4%
Large (more than 250)	21	3.4%	262	47.8%
TOTAL	790	100%	14.6	100%

Table 4.1. Breakdown of biotech firms by size. Source: Compiled internally from the information on companies collected by AseBio.

Catalonia, leader in biotech companies and turnover.

Catalonia continues to lead regional presence of biotech companies in Spain, with nearly 24% of the total and 54% of total turnover.

Plus, this region has a higher average turnover and makes up more than 1.2% of Gross value added (GVA) compared to the national average of 0.35% (table 4.2).

In terms of average turnover, behind Catalonia are the Community of Madrid, Aragon and Cantabria. However, in these communities the direct contribution of their biotechnology companies to the Gross value added (GVA) is below the national average.

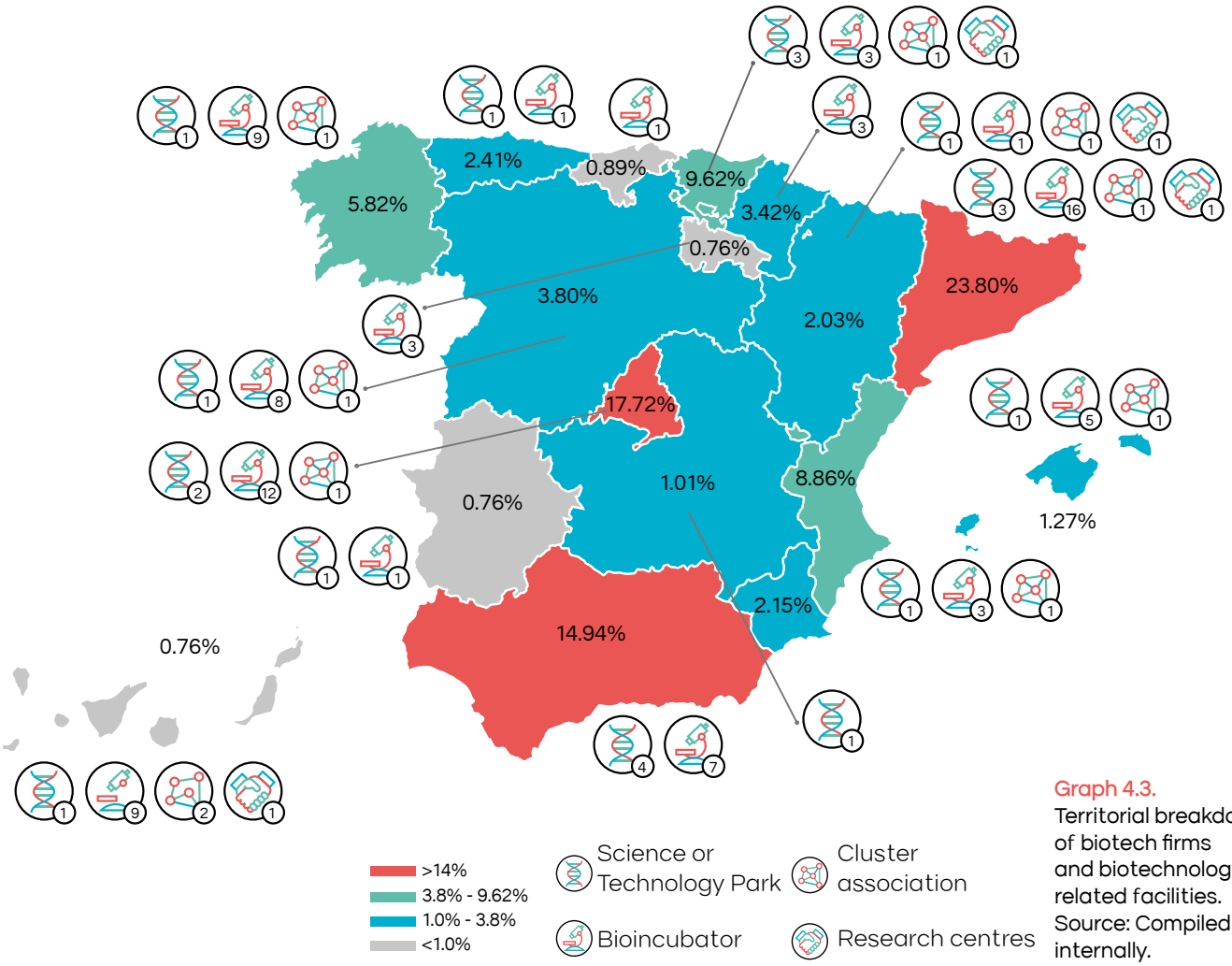
	Number of companies	% of total	Average turnover (€ millions)	% of total turnover	GVA in % of regional total
Andalusia	118	14.94%	4,3	4.40%	0.09%
Aragon	16	2.03%	19.8	2.76%	0.17%
Asturias	19	2.41%	3.0	0.50%	0.11%
Balearic Islands	10	1.27%	0.4	0.03%	0.01%
Canary Islands	6	0.76%	0.6	0.03%	0.00%
Cantabria	7	0.89%	16.6	1.01%	0.32%
Castile and Leon	30	3.80%	6.5	1.70%	0.16%
Castile-La Mancha	8	1.01%	6.1	0.42%	0.04%
Catalonia	188	23.80%	33.2	54.27%	1.22%
Valencian Community	70	8.86%	4.1	2.50%	0.07%
Extremadura	6	0.76%	3.6	0.19%	0.03%

Table 4.2. Territorial breakdown of biotech firms. Source: Compiled internally from the information on companies collected by AseBio.

Galicia	46	5.82%	7.2	2.89%	0.18%
Madrid	140	17.72%	22.3	27.07%	0.28%
Murcia	17	2.15%	1.2	0.18%	0.04%
Navarra	27	3.42%	3.4	0.79%	0.23%
Basque Country	76	9.62%	1.9	1.23%	0.10%
La Rioja	6	0.76%	0.6	0.03%	0.02%
TOTAL	790	100%	14.6	100%	0.35%

Graph 4.3 shows the distribution of biotech companies by Autonomous Community and the biotechnology related facilities in each one, including technology parks, business associations, sector clusters and research centres.

This map shows Catalonia has the largest number of companies, followed by the Community of Madrid and Andalusia. The next tier includes the Basque Country, Valencian Community and Galicia.
In terms of the biotechnology ecosystem, Catalonia is at the top, followed by the Community of Madrid, Andalusia, Canary Islands, Galicia and Castile and Leon, which are in the same tier in terms of number of facilities (research centres and science parks).



Graph 4.3.
Territorial breakdown of biotech firms and biotechnology-related facilities.
Source: Compiled internally.

In 2020, there were twice as many new biotech companies

AseBio's yearly study of the number of companies working in biotechnology created each year identified 56 new biotech companies, 29 more than in 2019, which means this figure doubled in just one year.

Of these companies, 16 were set up in Catalonia, 10 in Galicia, nine in Andalusia and seven in the Community of Madrid. Their activity, company name and Autonomous Community where they are located are in table 4.3.

Company name	Autonomous Community	Activity
Accure Therapeutics	Catalonia	Developing innovative drugs for the central nervous system (CNS).
Agroisa	Andalusia	Experimental R&D in biotechnology. Services for developing biotechnology and microbial solutions, in food microbiology, nutrition and health.
Altum Sequencing	Madrid	Next-generation sequencing (NGS) based on reading DNA to detect genetic markers for each patient, inserting and deleting DNA and quantifying them after therapy.
Ancor Tecnológica	Canarias	Developing a virucide that certifies textile protection against coronavirus for one week after use.
Aptadel Therapeutics	Catalonia	Developing a new platform for targeted cancer therapy, consisting in nanoparticles loaded with therapeutic agents, such as RNA molecules or chemotherapy drugs, for various target tumours.
Arnigal Cultivos	Galicia	Developing ingredients for pharmaceutical cosmetics using medicinal plants, focused on establishing and improving medicinal plant crops and developing new products using techniques to extract active pharmaceutical ingredients.
Arthropotech	Murcia	Biotechnology using arthropods and other insects.
Atlantic Blending	Galicia	Making natural fermented beverages with native microorganisms and local raw materials.
Atten Bio	Basque Country	Technology platform to detect several viruses using one test that is highly sensitive, immediate, distributed and doesn't require a sample.

Bflow	Galicia	Personalised solutions for micro-flow devices for preclinical validation.
Bioacores	Madrid	Using waste from the food industry, obtaining pectin, sugars, antioxidants and ursolic acid for applications in the food, nutrition, pharmaceutical and cosmetics sectors.
Bioactive Surfaces	Madrid	Producing and commercialising surfaces for biomedical and food use.
bioSEQs Genomics	Castile and Leon	Identifying and typing for full genome sequencing.
Cetec Biotechnology	Murcia	Applied research in the field of sustainable and biodegradable materials, and developing technology in the field of environmental decontamination using microorganisms for bioremediation of contaminated water and soil.
Corify Care	Madrid	High-density electrocardiograph system to provide support in guiding procedures that require intracavitary navigation, such as radiofrequency ablation for atrial fibrillation. The technology is based on resolution as the inverse problem of electrocardiography.
Deepull Diagnostics	Catalonia	System for early diagnosis of sepsis, identifying pathogens quickly and precisely using an antibiogram and managing data on the patient's state to guide doctors in treatment.
Diecolpet	Asturias	R&D of veterinary products for pets. Innovative, organic and biodegradable products.
Duponte Investigación y Desarrollo	Andalusia	Developing pharmacogenomic tests.
Evoenzyme	Madrid	Developing and commercialising ligninolytic enzymes designed through directed evolution for various industrial applications. Solutions for the pharmaceutical, chemical, food and beverage, and environmental sectors.
Exheus	Catalonia	Analysis of how over 22,000 genes are being activated using a blood sample.
Flowreserve labs	Galicia	Personalised medicine solutions in cardiology to provide cardiology diagnostic indicators using non-invasive methods obtained from CAT scans and flow-dynamics models.
Gate2brain	Catalonia	Combining various families of peptides that act as a shuttle to cross the blood-brain barrier, with a therapeutic focus on solid tumours with strong barriers to administer cancer drugs.

Genestore Iberia	Andalusia	Personalised genomics for the health and wellness sector, molecular diagnostics and genomic techniques to identify and validate therapeutic targets and active molecules.
Genome4care	Galicia	Diagnostic support tool based on mass sequencing, phenotype analysis and pattern recognition, specifically designed to diagnose neurological, muscular, skeletal, kidney, digestive, lung, haematological and oncohaematological disorders.
Genomi Diagnostics	Balearic Islands	Developing and commercialising medical devices and fungibles to diagnose or guide human or veterinary therapeutics.
Gyala Therapeutics	Catalonia	Developing new CAR-T therapies to treat malignant haematology diseases.
Inbiomiter	Andalusia	R&D using molecular and cell analysis prototypes that include bionanotechnology and help doctors substantially improve diagnosis of degenerative diseases and make therapeutic intervention more effective.
Integra Therapeutics	Catalonia	Combination of CRISPR systems and gene transfer efficiency of integrases and viral transposases.
Krei Method	Catalonia	KREI analysis method ensures identification and individualisation of a cannabis sample. By extracting the fingerprint of an unknown sample of Cannabis sativa L., KREI allows for forensic identification and tracking of the strain.
Kytaron Biotech	Asturias	Developing biotechnology products for environmental applications through technology and innovative processes, transferring innovation from fields like molecular genetics and artificial intelligence to the environmental sector.
Laboratoire Laredo	Basque Country	Studying and developing an innovative drug that aims to decrease intraocular pressure and has neuroprotective actions, to treat various eye diseases.
Libera Bio	Galicia	Developing new oncology treatments based on patented MPN
Lidaf centro de investigacion	Andalusia	Studying the bioactivity of food components, obtaining and assessing antioxidants, ingredients and functional foods from natural sources (legumes, microalgae, yeasts, herbs, etc.) and taking advantage of surplus and byproducts from the agrifood sector.
Mass Volt Biorrefinerias	Galicia	Developing and commercialising biorefineries that transform organic waste into energy and bioproducts, bringing the most value added. Resolving issues arising from managing organic waste (transport, sorting, distribution, etc.) and putting it back into the production chain.
Match Biosystems	Valencia	Developing a new generation of in vitro diagnostic tests.

MDR Newco	Catalonia	Discovering and developing projects related to antimicrobial resistance, including a quick test to diagnose pneumonia.
Medbioinformatics	Catalonia	Characterising the relationship between genomic variants and diseases to identify the processes involved in pathogenesis of the disease and identify treatment and prevention strategies.
Microbial Biosystems	Madrid	Researching a sustainable alternative to petroleum-based plastic by producing high-quality bioplastics from organic waste using fermentation, for use in packaging, medical implants, cosmetics, fertiliser coatings, etc.
Mifco Biobrands	Andalusia	Growing, processing, extracting, isolating and purifying active pharmaceutical ingredients from medicinal plants.
Mydnamap	Basque Country	Developing genetic analysis tools and personalised genetic monitoring and guidance services.
Neoxenica Biotech	Galicia	Developing miniature devices and quick methods combining molecular biology, micro- and nano-manufacturing and chemical analysis for quick, specific, on-site diagnosis of food-borne pathogens.
Neuroscience Innovative Technologies	Asturias	Designing, developing and commercialising innovative solutions to treat and diagnose neurological diseases by developing new drug delivery methods, developing and researching new molecules with therapeutic applications and drug repositioning.
Olavide Neuron Stx	Andalusia	Research based on steroidal hormones, which regulate processes like the changes associated with puberty and affect the progression of Alzheimer, developing a drug (STX64) to treat this disease.
OneChain Immunotherapeutics	Catalonia	Developing immunotherapy for haematological neoplasms using CAR-T candidates for various antigens.
Pulmobiotics	Catalonia	Developing new treatments and vaccines for respiratory diseases.
Recovid Solutions	Valencia	Doing validated PCR and antibody tests in a network of certified labs to help respond, through science and technology, to manage the pandemic.
Reveal Genomics	Catalonia	Developing precision diagnostic tools for advanced or metastatic breast cancer, based on combining various genomic data.
Ruti Immunotherapeutics	Catalonia	R&D manufacturing, commercialising, exporting and distributing drugs to treat viral and bacterial infections, as well as other illnesses.
Selmar Oncotech	Madrid	Platform to test active pharmaceutical ingredients in living organisms, brain tumour models.

Table 4.3.
Companies devoted to biotechnology that began working in 2020.
Source: AseBio with collaboration from IDEA Agency, CEEI Asturias, Bioibal Baleares, Canary Islands Special Zone (ZEC), Sodercan Group, Albacete Technology Park, ICE Castile-La Mancha, Castile and Leon, **BIOCAT, Axencia Galega de General Directorate of Innovation, Labour,** Industry and Commerce (La Rioja Government), Knowledge Foundation Madri+d FPCM, Institute of Development of the Region of Murcia, General Directorate for Industry, Energy and Innovation (Navarra Government), CEIN, SPRI and CEEI Valencia.

Sensor4tex	Andalusia	R&D, manufacturing and commercialising biotechnology products and services at the intersection of smart, biofunctional clothing, garments and accessories with biometric monitoring and sensors.
Seritech Europe	Catalonia	Developing silk protein polymers as medical-grade injectable micro-vectors for targeted drug delivery.
Smart vitamins	Galicia	Developing technology to treat autoimmune diseases with smart nano-vehicles, based on synergic combinations of essential nutrients.
Statera labs	Galicia	Designing, developing, manufacturing and commercialising nutraceuticals for humans and animals and bioactive ingredients for the food industry.
Stem Cell lab	Balearic Islands	Experimental research and development in biotechnology, lab services with stem cells.
Telomere Therapeutics	Catalonia	Telomerase gene therapy to treat pathologies associated with telomerase shortening, such as pulmonary and kidney fibrosis; and, therefore, ageing.
Verigraft Iberia	Andalusia	Research in regenerative medicine and developing new bio-engineered artificial tissues.

VIVEbiotech is a Contract Development and Manufacturing Organisation (CDMO) that develops and manufactures GMP-quality lentiviral vectors with extensive, solid experience in manufacturing vectors for rare/super-rare diseases and cell therapy projects using immune cells (CAR-T, TCR, etc.).

VIVEbiotech works to both EMA and FDA regulations and is currently taking part in 35 international projects with companies based in US, Europe and Asia. Some of our partners include Xyphos (under Astellas), Emendo Biotherapeutics and Zelluna Immunotherapy.

VIIVEbiotech is one of the only companies in the world that specialises exclusively in lentiviral vectors. One of the things that sets us apart is our experience not only in manufacturing but also in virology, backed by a team of professionals with over 30 years of experience.

We have the capacity and flexibility to develop and produce personalised lentiviral vectors from the earliest stages of development.

VIVEbiotech guides clients through every step of developing and producing their therapies. Our deep knowledge and experience in both virology and optimisation of production processes allow us to provide solutions to any challenges that come up during the process.

VIVEbiotech has both upstream (USP - production) and down-stream (DSP - purification) process optimisation departments, which makes our process highly productive and the products highly functional.

These departments help improve the profitability, scalability, regulatory compliance and quality of the production process, as well as the intrinsic biological traits of the vectors themselves.

VIVEbiotech has developed latest-generation technology, patented worldwide, called Lentisoma, which offers unique solutions with multiple advantages in non-integration and stability.

VIVEbiotech has just inaugurated its new facilities to manufacture lentiviral vectors for the gene and cell therapy sector. At these facilities, we can manufacture everything from small batches for early-stage research through to GMP batches for clinical and commercial use.

These new facilities will allow VIVEbiotech to significantly increase its production capacity and deliver commercial-size batches of lentiviral vectors to both new and existing customers in the cell and gene therapy industry.

VIVEbiotech's production capacity will increase by 400% at the new facilities, with an increase in average number of batches per year from 20 in 2020 to 80 in 2022.

VIVE biotech

GENE TRANSFER TECHNOLOGIES

ENVIRONMENTAL CONDITIONS

05

ENVIRONMENTAL CONDITIONS

5.1 How society sees our work: The public value of science, innovation and biotechnology.

Introduction.

2020 was a year marked by an emergency and an economic crisis without precedent. However, it was also a year in which, for the first time, the sector gained widespread social recognition for creating Covid-19 vaccines, diagnostic tests and drugs.

For companies in the sector, this change in public opinion is very positive and they highlight it as a key element for carrying out their work. Nevertheless, both society and the biotechnology sector still believe R&D investment is insufficient.

AseBio members noted the difficult economic situation as one of the main barriers to their work. In this context, companies have shown their ability to adapt and respond. In fact, 90% of these companies have kept all their staff, despite noting significant delays in their R&D processes and clinical trials.

In less than a year, society's belief in scientific knowledge as the best basis for laws and regulations rose 30%.

In July 2020 and January 2021, the Spanish Foundation for Science and Technology (FECYT) did two surveys on social perception of the scientific aspects of Covid-19.

The questions they asked the general public included whether they considered scientific knowledge the best basis for laws and regulations. While in July the results of those surveyed showed 37% totally agreed, in January 2021 it was 67%.

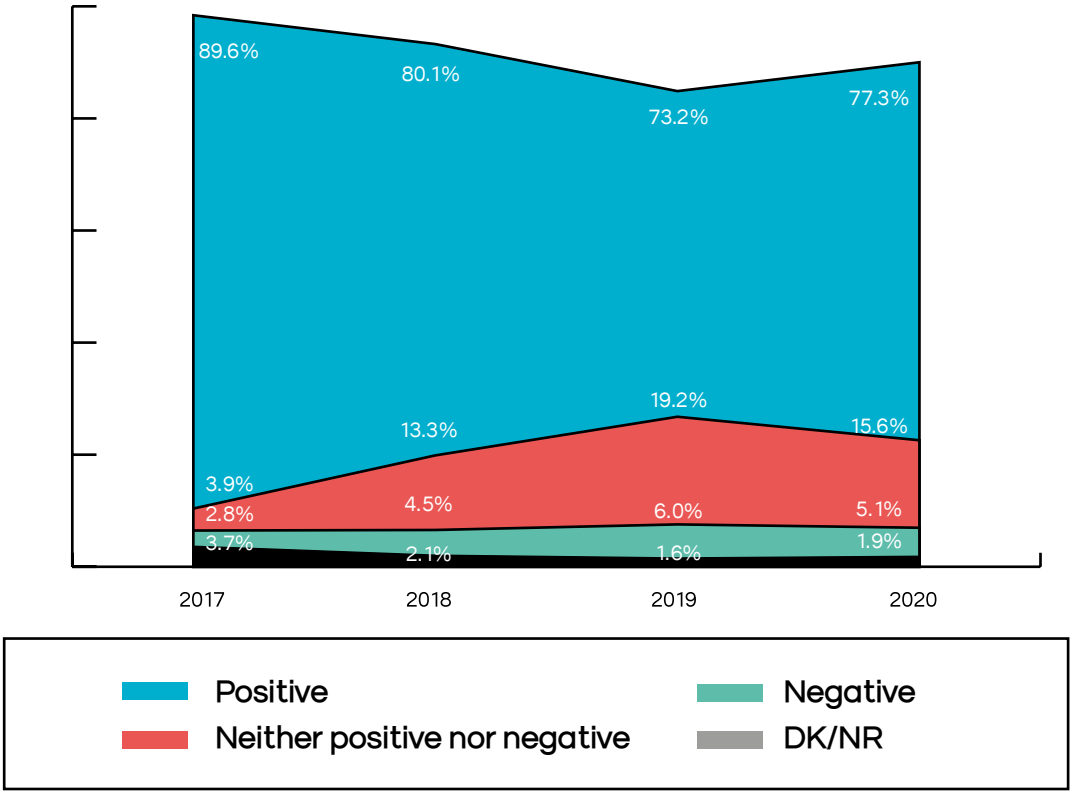
People's willingness to get the Covid-19 vaccine rose to 60% in January 2021.

Both the Centre for Sociological Research (CIS) and FECYT conducted several surveys on how willing people are to get vaccinated. The CIS surveys were done from July to December, with results improving month on month. In July, 43% of the people surveyed were not willing to get vaccinated immediately, while in December it was only 28%. However, the number of people willing to get the vaccine if they had guarantees that it was tested and reliable rose from 2.2% to 16.2%.

For its part, the FECYT survey from July 2020 showed 32% were totally sure about getting the vaccine and in January 2021 that figure rose to 58%.

Social perception of Spanish innovation improves.

The survey on Social Perception of Innovation in Spanish society COTEC conducted in late 2020 showed that the pandemic has improved Spaniards' view of innovation (77% see it as something positive, up 4% from 2019).

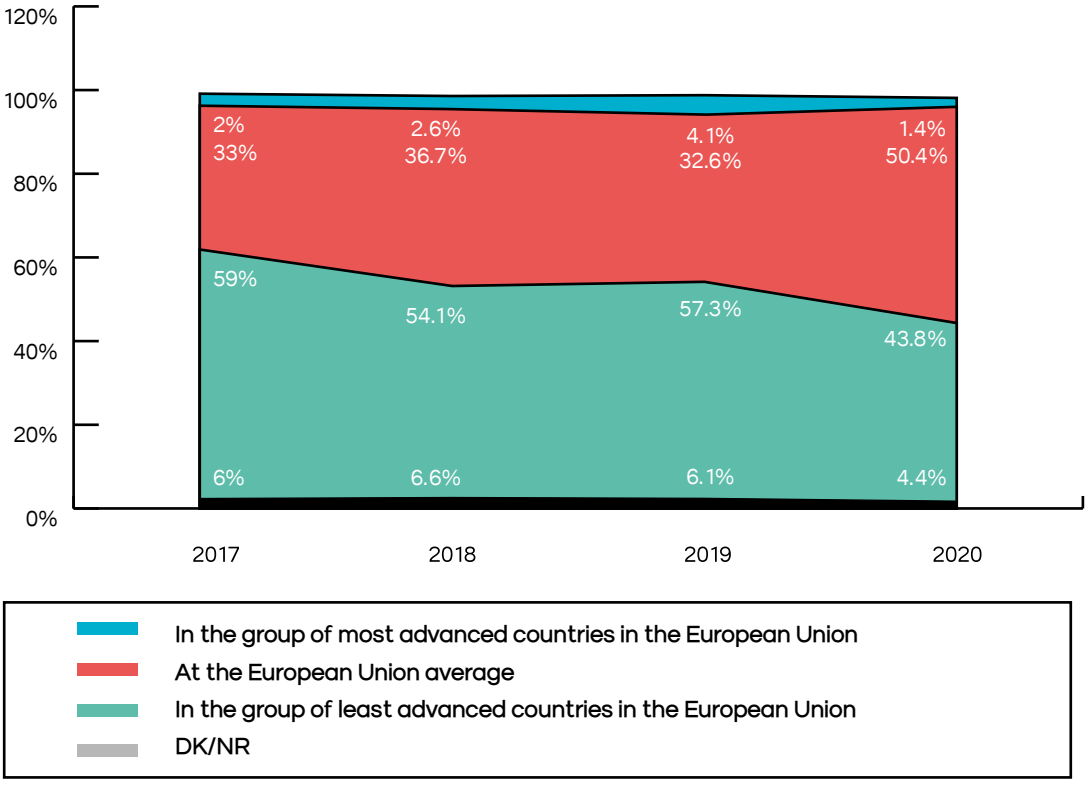


Graph 5.1.
Evolution of opinion of innovation 2017-2020.
Source: COTEC.

Perception of Spanish innovation compared to Europe worsens.

Society's perception of the level of innovation in Spain relative to other countries in the European Union fell.

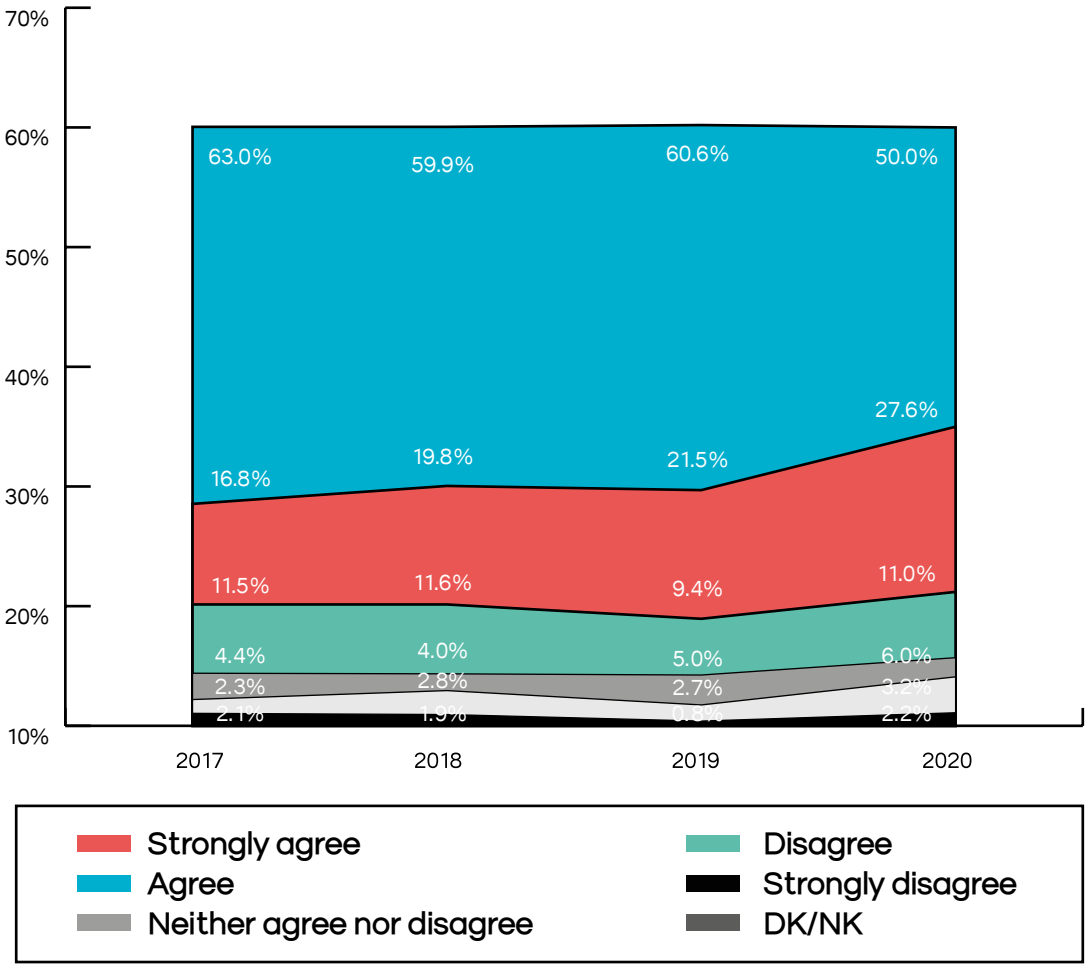
While in 2019, 32.6% of those surveyed put Spain among the most advanced countries in the EU, in 2020 half (50.4%) put Spanish innovation among the least developed European countries (graph 5.2).



Graph 5.2.
Evolution of opinion of Spanish innovation compared to European Union 2017-2020.
Source: COTEC.

Spanish society considers Spanish investment in innovation insufficient.

Of those surveyed, 78% believe that public investment in R&D is insufficient, although this is an improvement on the previous year, when 82% of those surveyed believed it wasn't enough. Plus, 73% of those surveyed would support earmarking more government funds for research, development and innovation.

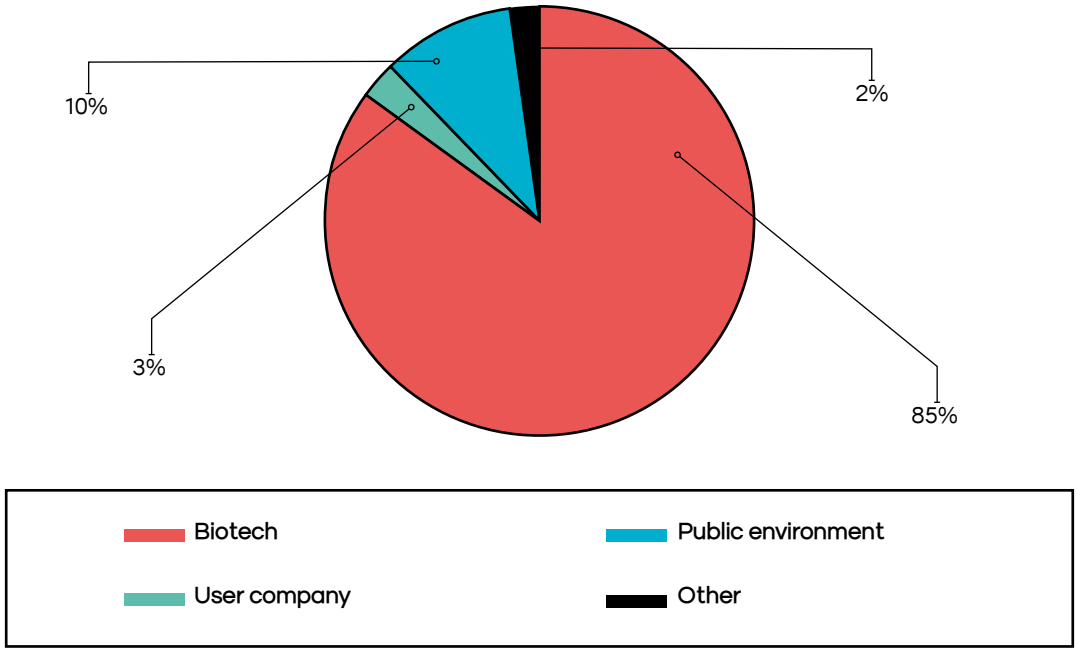


Graph 5.3.
Evolution of opinion of insufficiency of public R&D investment.
Source: COTEC.

5.2 How the biotechnology sector sees its work environment.

In the 2019 AseBio Report, we started a new way of assessing how the sector perceives its work environment. We asked AseBio members to rate a series of factors based on whether they contributed positively or negatively to the development of the biotechnology sector in Spain.

This year's survey had 60 participants, 85% were biotechnology companies, followed by organisations in the public sphere with 10%. Table 5.1 shows the results of the survey rating 21 factors. A rating of 1 is very negative and 2, negative; a 3 is positive and a 4, very positive.



Graph 5.4.
Breakdown of participants in the perception of environment survey by type of organisation.

AseBio members perceive the improvement in public opinion of biotechnology in 2020 as very positive to their work.

The elements of the environment AseBio members valued most are public perception of the sector, training level of their workers and staff, the increase in information on the biotechnology market and in demand for their products, and collaboration with the public sector.

In a year when Covid-19 clearly demonstrated the value of R&D in general and of biotechnology specifically, the sector perceived this improvement in public opinion as being a very positive change for its work. In fact, this change in public opinion is the most highly rated element for companies and organisations in the Spanish biotechnology sector.

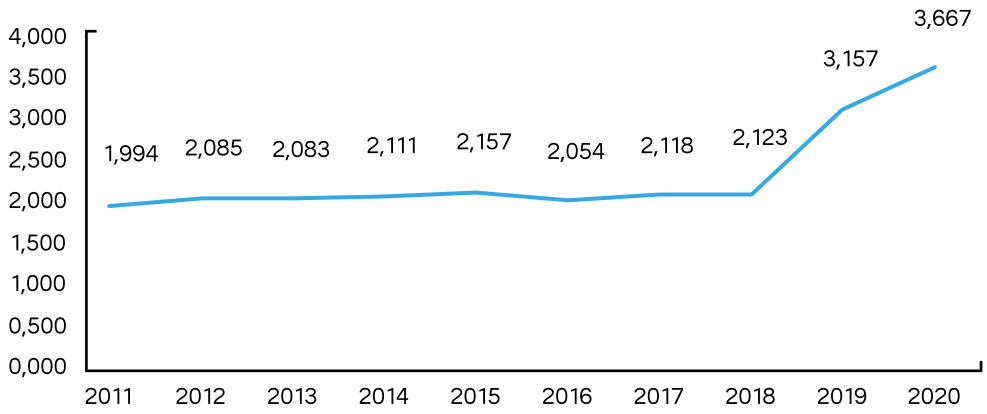
In 2020, AseBio members said difficulties with internationalisation were their main hurdle.

AseBio members rated 15 elements of their environment positively, which is over 2.5 points. The elements that stand out in this group include public opinion of biotechnology, training level of workers, qualified personnel, demand for more sophisticated products with high value added, information on the biotechnology market and cooperation with universities, IPOs and technology centres. On the other hand, the lowest rated include the time to profitability, regulatory framework, access to funding, cost of innovation, public administration and, finally, the economic situation.

Factors of the environment	2020	2019	Average 2000-2020	% Variation 2019-2020
Public opinion of biotechnology	3.667	3.157	2.178	16%
Employee training level	3.283	3.275	3.916	0%
Qualified personnel	3.233	3.216	2.050	1%
Demand for more sophisticated products with higher value added	3.190	3.021	3.314	6%
Information on the biotechnology market	3.133	2.900	2.213	8%
Cooperation with universities/IPOs and technology centres	3.050	3.040	2.171	0%
Internationalisation process	2.933	3.216	1.285	-9%
Number of bioentrepreneurs	2.932	3.220	2.233	-9%
Specialised suppliers (consultants, lawyers, etc.)	2.932	3.040	2.151	-4%
Mergers/acquisitions/ strategic alliances	2.867	2.922	2.862	-2%
Market-orientated nature of the public technology offering	2.810	2.804	2.328	0%
Specialised facilities (technology centres, etc.)	2.800	3.060	2.133	-8%
Increase in average size of biotechnology companies	2.783	3.040	2.676	-8%
Creation of new companies in Spain	2.750	3.200	2.743	-14%
Attracting international companies	2.583	3.120	2.759	-17%
Time to profitability	2.390	2.277	2.172	5%
Regulatory framework	2.390	2.375	0.380	1%
Access to funding	2.373	2.327	1.099	2%
Cost of innovation	2.220	2.085	2.179	6%
Public administration	2.203	2.326	0.823	-5%
Economic situation	1.950	2.146	2.223	-9%

Table 5.1. Rating for factors, average and % change. Source: AseBio.

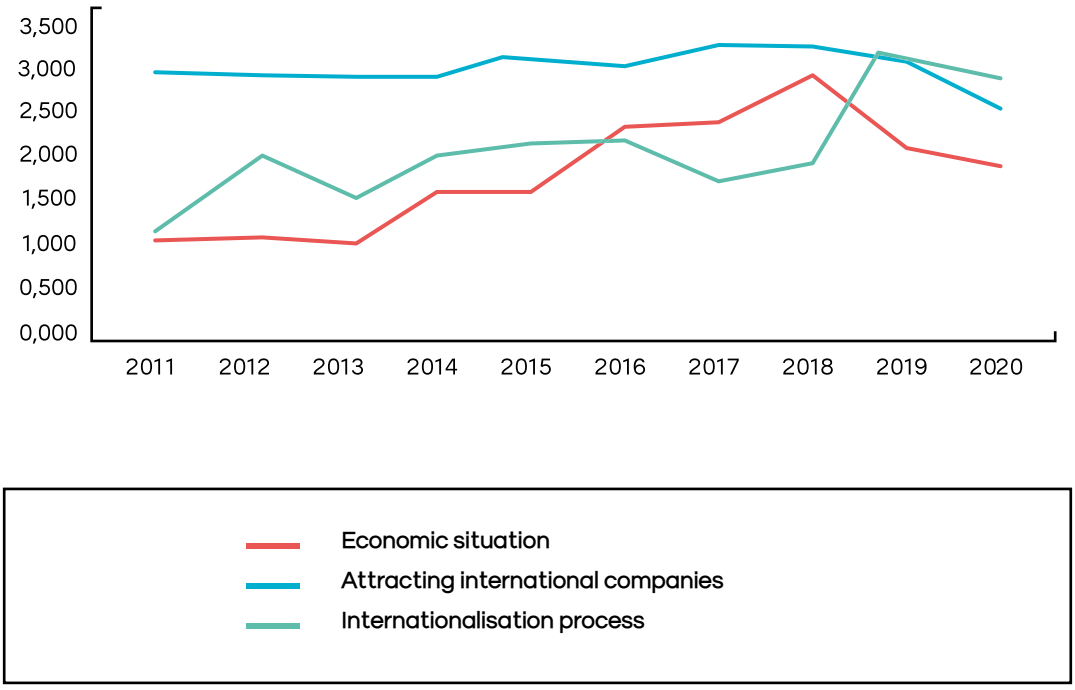
Graph 5.5 shows how the sector's perception of public opinion of biotechnology has evolved. Over the past two years, the sector has perceived a better public opinion of their work in the biotechnology sector.



Graph 5.5.
Evolution of public opinion towards biotechnology (2011-2020).
Source: AseBio.

Companies said the economic situation is the main hurdle they face in their work (graph 5.6), dropping to a level similar to five years ago. In this regard, also due to the economic crisis, companies also rated issues associated with internationalisation negatively.

This rating dropped significantly due to the global economic situation due to Covid-19.



Graph 5.6.
Evolution of economic situation, attracting international companies and internationalisation 2011-2020.
Source: AseBio.

5.3 The impact of the pandemic on the biotechnology sector

AseBio survey on the impact of Covid-19 on the biotechnology sector.

2020 was a year marked by the Covid-19 healthcare crisis. A year when biotechnology was seen as an essential activity and in which companies worked against the clock to find a solution to the pandemic, showing their resilience and ability to respond. So, despite the economic crisis, 90% of companies maintained their level of activity during the State of Emergency and the months that followed, and nearly all the companies kept their whole staff on.

Plus, as the following section on the results of collaboration shows, half of all those surveyed pivoted their activity to Covid-19 to help respond to the healthcare emergency.

Access to private funding held stable and roughly 60% of those surveyed weren't impacted negatively in terms of income and most had a positive view of long-term turnover.

However, 40% of those surveyed believed they had been impacted negatively and had a hard time gaining access to instruments for R&D aid.

The main consequence of the healthcare emergency on biotechnology companies affected their R&D, as they had to slow down or even stop their R&D projects and clinical trials. More than half (55%) affirmed that the healthcare emergency had affected the timeline of their projects and 71% said that clinical research had been affected negatively. Projects were slowed down as a result of R&D centres having to close, hospital ethics committees having to limit their activity, or difficulties recruiting patients to take part in clinical studies, as hospitals were more focused on treating Covid-19 patients.

Finally, the sector has seen more complications in closing deals and collaboration agreements, as companies have not been able to take part in networking activities.

Science and technology for sustainable human progress

The pandemic has shown that science and technology can be leveraged to find solutions to emergencies, as well as to build our future. Thanks to the hard work and unprecedented collaboration among stakeholders in the healthcare system, public and private initiative, countries and multilateral bodies, just nine months after the WHO declared the pandemic, we had access to the first vaccine in Spain.

At Merck, we have been focused on finding innovative solutions to the challenges that affect society for over 350 years. Solutions based on science and technology, with innovation as their driving force to have a real impact on people's lives and allow us to fulfil our purpose: contributing to sustainable human progress.

During the pandemic, we've renewed our commitment to finding solutions through partnerships and cooperation. Merck was one of the first companies to publish the oligo sequence to diagnose Covid-19. The 2021 Access to Medicine Index reflects this spirit of collaboration, recognising Merck as having shared more intellectual property to fight Covid-19 than any other company.

With this emphasis on collaboration, our focus is on meeting scientists' needs, with solutions to prevent, diagnose and treat the infection. We are currently collaborating to support production of more than 35 diagnostic tests and development of over 20 molecular antibodies, plasma products and antiviral drugs.

We are contributing products, raw materials and technology to development efforts for nearly 50 Covid-19 vaccines around the world, joining forces with other companies and organisations including an international consortium with the Bill & Melinda Gates Foundation and a strategic collaboration with BioNtech to supply the lipids needed to produce the vaccine.

We also contribute digital solutions, like the Synthia™ software that analyses decades of research to accelerate discovery of the most viable drugs. We are also focusing on finding treatments for the virus. Currently, we are doing a phase II study on a therapeutic molecule for pneumonia caused by Covid-19.

Science and technology have been key pillars in the search for solutions to the pandemic. But they are also essential to the success of the European and Spanish recovery strategies.
We must transform healthcare systems to make them more resilient and allow them to offer solutions to challenges like ageing and the growing prevalence of chronic diseases like cancer.

At Merck, we are fully aware of this need to transform healthcare systems and are convinced that the digital transformation, which is part of the recovery plans, is a real opportunity to accelerate this process. We're part of numerous alliances to use new digital technology, such as AI, to speed up procedures and get innovation to patients as quickly as possible, cutting the time needed for research, development and mass production of new drugs.

Another line of work is personalised healthcare, giving each patient what they need as quickly as possible, with the resulting savings, helping make the system more sustainable. In this regard, our research focuses on three areas: oncology, immuno-oncology and neurology, studying options that seek to treat subgroups of patients that can benefit from this disruptive innovation.
Innovation that must be available to patients as soon as possible, as this final step in the path towards personalised therapies is essential to reach a goal we all share: better health and wellbeing.

In addition to transforming the healthcare system through new digital technology, reindustrialising the country is another solution to leverage recovery in the plans, which are committed to a solid, sustainable industrial sector to tackle future healthcare emergencies and fuel an economy that can generate wealth and jobs. Of the 18 production and research plants Merck has around the world, 13 are located in Europe and three in Spain.

They all work to serve R&D, generating high-quality employment and economic activity.

The Profarma programme to foster competitiveness in the pharmaceutical industry has highlighted the activity of Merck sites, rating very highly the investment and commitment to quality employment and technological development.

This race against the clock that started with the outbreak of the pandemic has proven to be a powerful wake-up call for all of us that are part of the healthcare sector to join forces to fight a common enemy, sharing more and competing less.
And now, with the digital transition and reindustrialisation as European goals, we must remain united in our efforts to make sure the transformative potential of new digital technology, with the scientific advances of biotechnology, become a reality, as innovation available to all.

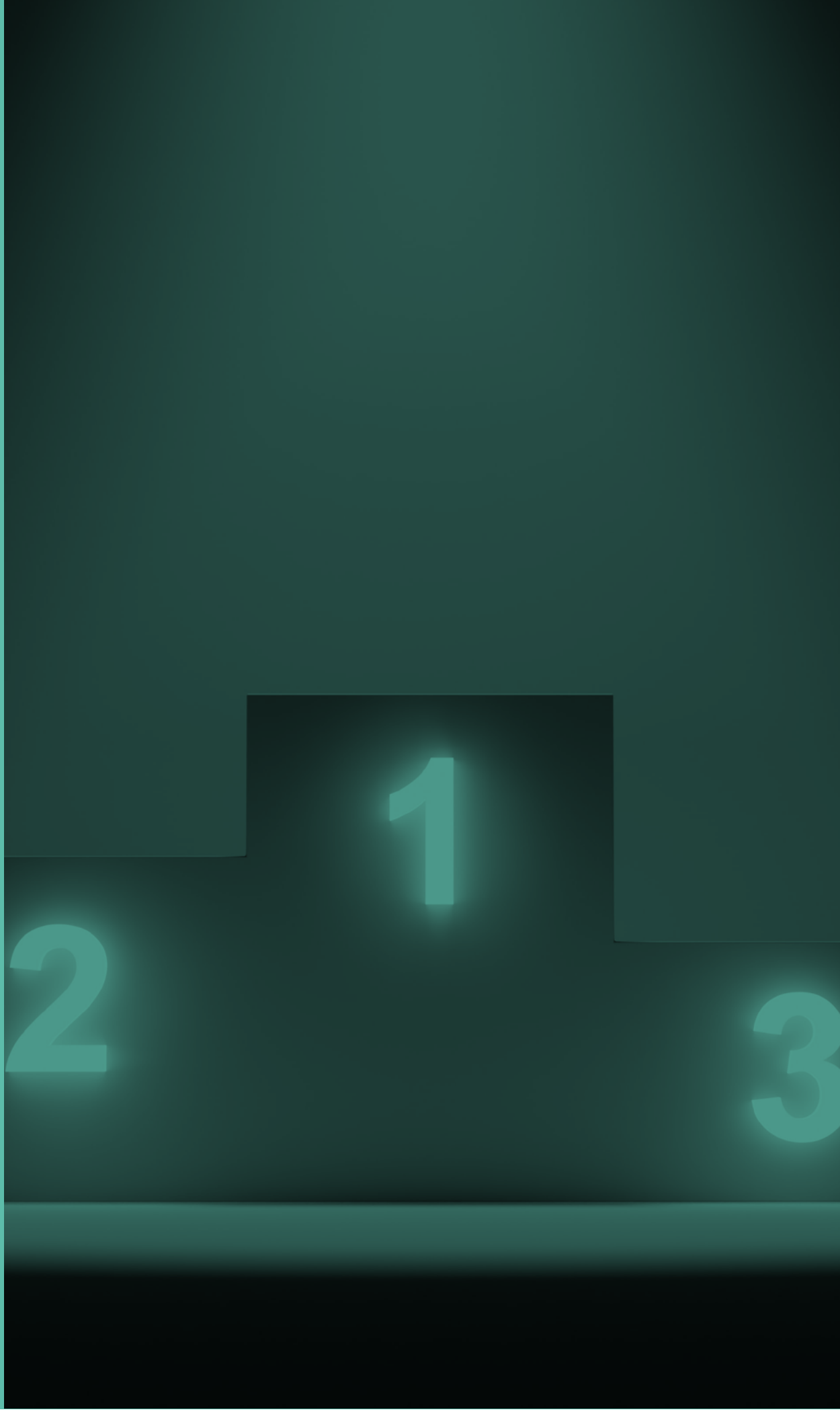
At Merck, we firmly believe that human progress is achieved through science and technology, and with all the stakeholders in the healthcare sector working together.

Miguel Fernández Alcalde, general manager of Merck in Spain

Merck

RESULTS OF THE BIOTECH SECTOR

06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RESULTS OF THE BIOTECH SECTOR

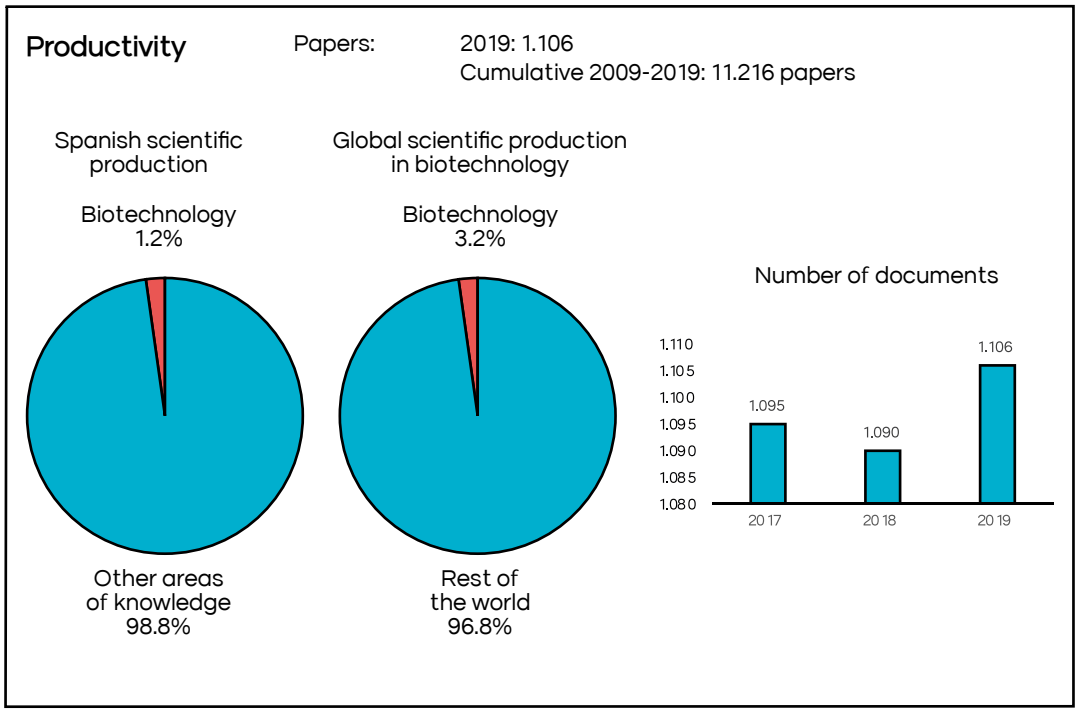
6.1 Production of scientific knowledge

Spanish biotechnology makes up 3.2% of global production in this area and is cited 30% more than the global average.

In 2019, scientific production in biotechnology made up 1.2% of all scientific production in Spain, with 1,106 papers, and 3.2% of global scientific production in this area (graph 6.1).

The normalised impact of Spanish scientific production in biotechnology was 1.3 in 2019. This means that Spanish scientific production in biotechnology was cited 30% more than the global average in this area.

Spanish biotechnology produces science of excellence, with 26% (286) of papers among the top 10% most cited in the world. This percentage is clearly above the Spanish average (Spanish average for all areas of knowledge: 16.2%).



Graph 6.1.
Bibliometric overview of Spanish research in biotechnology, 2009-2019
Source: FECYT, from data using the SciVal-SCOPUS tool in May 2021.

Spain rose one position on the ranking by documents in biotechnology, to 8th in the world.

China and the United States have the highest production in terms of number of scientific documents.
The proportion of scientific production in biotechnology to general scientific production is the highest in India and South Korea. Spain rose one position from the previous year to 8th in number of documents in biotechnology.

Ranking	Country	Number of documents	Number of documents in biotechnology	Scientific production in biotechnology out of total (%)
1	China	5,111,602	74,033	1.45%
2	United States	6,141,442	67,856	1.10%
3	India	1,324,976	33,275	2.51%
4	Japan	1,373,283	21,674	1.58%
5	Germany	1,671,179	21,105	1.26%
6	South Korea	805,217	20,430	2.54%
7	United Kingdom	1,769,162	16,587	0.94%
8	Spain	872,653	11,216	1.29%
9	France	1,161,543	11,198	0.96%
10	Italy	1,038,531	10,682	1.03%

Normalised impact of biotechnology	Scientific production in biotechnology in high-impact journals (Q1) (%)	Scientific production in biotechnology of excellence (%)	Scientific production in biotechnology as part of international collaboration (%)
1.13	46.8%	18.8%	22.9%
1.53	70.9%	24.5%	40.1%
0.62	15.3%	9.2%	13.3%
0.83	35.8%	9.6%	27.5%
1.37	64.7%	22.2%	50.0%
0.93	33.3%	13.2%	24.4%
1.48	68.3%	24.5%	61.0%
1.33	61.2%	22.2%	49.6%
1.36	67.1%	21.1%	60.2%
1.3	57.6%	21.7%	46.8%

Table 6.1.
Top 10 countries in scientific production in biotechnology. 2009-2019. Source: FECYT.

More than half of scientific production is done as part of international collaboration.

International collaboration in Spanish scientific production in biotechnology has grown steadily in recent years, although it did drop slightly last year (1.89%).

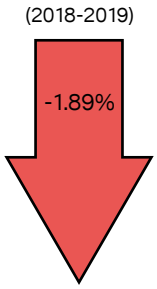
The percentage of documents on biotechnology authored by Spanish and foreign institutions went from 41.3% in 2009 to 56.2% in 2019, with 622 documents (graph 6.2).

Collaboration (2018-2019)

Papers as part of international collaboration

Biotechnology: 622

Cumulative biotechnology (2009-2019): 5,567
% of Spanish scientific production: 56.2%

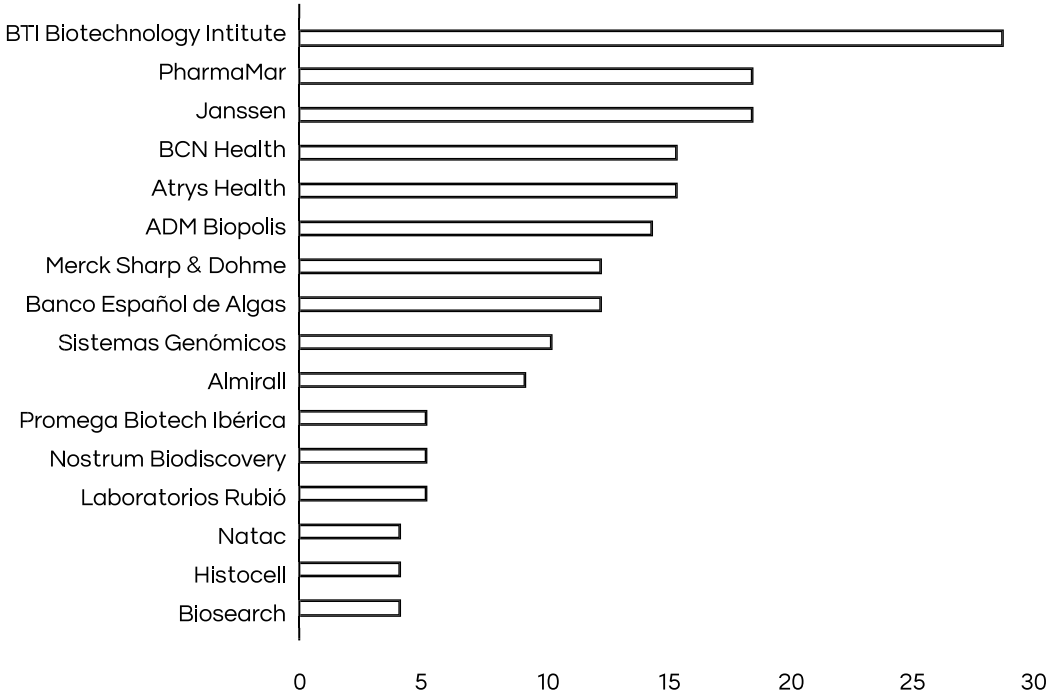


Graph 6.2.
Collaborative papers.
Source: FECYT.

Biotechnology companies increased scientific production efforts by 11%.

Every year, AseBio surveys its members, both Spanish companies and multinational corporations with offices in Spain, on their publications in high-impact science journals.

In 2020, these companies published a joint total of 209 papers, which was 24 more than in 2019, up 11.5%. Among the companies with the most publications (graph 6.3), we find BTI Biotechnology Institute first with 28, followed by PharmaMar and Janssen with 18 each, BCN Health and Atrys Health with 15, and ADM Biopolis with 14.



Graph 6.3.
Number of science papers published in 2020 by AseBio member companies.
Source: AseBio.

The Company

Promega Biotech Ibérica, a subsidiary of the US Promega Corporation, celebrated 15 years in Spain last year, at a time when our work and that of the biotechnology sector was more essential than ever.
The over 4,000 products in our catalogue help scientists at research centres, universities and hospitals, as well as pharmaceutical and biotechnology companies, to progress in their work. In general, our clients rate the robustness of our products very highly, which is achieved thanks to the high-quality standards we apply, and our post-sales service, above all the scientific advisory services by our specialists.

Scientific vocation

We are a company with a strong scientific vocation and we like to maintain close contact with researchers, not only to offer them our solutions but also to share our know-how and carry out joint projects as an industrial partner.
The company reinvests nearly 10% of its profits in R&D, which is carried out mainly at our newly inaugurated cutting-edge research centre, Kornberg Centre, in Madison (Wisconsin).

Since last year, a good part of our activity has focused on the Covid-19 pandemic.
We are one of the main suppliers of viral RNA extraction systems and PCR reagents. As a result, we have contributed notably to automating the workflow in many hospitals and clinical diagnostic labs involved in testing for SARS-CoV-2.

Our components have been used in roughly 30 different Covid-19 diagnosis kits and our extraction and PCR reagents have made it possible to test nearly 750 million SARS-CoV-2 samples all over the world. At the same time, we have been working with labs developing vaccines and smart therapies, and are about to launch our own antibody test, LUMIT™ SARS-CoV-2, based on proprietary bioluminescence technology that is celebrating the 30th anniversary of its first experimental application this year.

We help speed up our clients' workflow by sharing our technology and R&D experience, providing support services after delivery to ensure the assays work for them.
We also offer consultancy services and tailor trials in a wide range of fields of research, including protein degradation, CRISPR gene editing, biotrials, kinase biology, cell metabolism and inflammasomes.

In 2020, we trademarked the OncoMate™ MSI Dx kit, a clinical diagnosis tool for molecular oncology labs that shows the microsatellite instability (MSI) of a tumour, helping guide patients' immunotherapy decision-making.

Plus, we have also introduced the Spectrum™ Compact CE system, a capillary electrophoresis instrument designed to analyse DNA fragments and sequences for clinical and forensic applications.

Social Responsibility

Although we couldn't celebrate due to the pandemic, 2020 was our 15th anniversary in Spain. Like most companies, we had to work remotely to manage the unprecedented demand and provide 24/7 support for the healthcare system from home, surrounded by our families.

Apart from trying to mitigate the environmental impact of our activity as much as possible, one key element of our social responsibility programme focuses on supporting young scientists. Each year, we guide several teams of students participating in the iGEM synthetic biology competition, and in 2020 we also collaborated with the Barcelona Science Park for the first time on its BATX2LAB programme for baccalaureate students, working to get them interested in STEM degree programmes by letting them do experiments guided by PCB researchers.
Furthermore, for some years now, we have been working with the postgraduate programme at the Autonomous University of Madrid Faculty of Science, providing career guidance for students.

Promega

6.2 Technological innovation

The biotechnology sector continues to patent mainly in international arenas.

We have counted 557 patent applications and 233 patents granted in Spain in 2020.

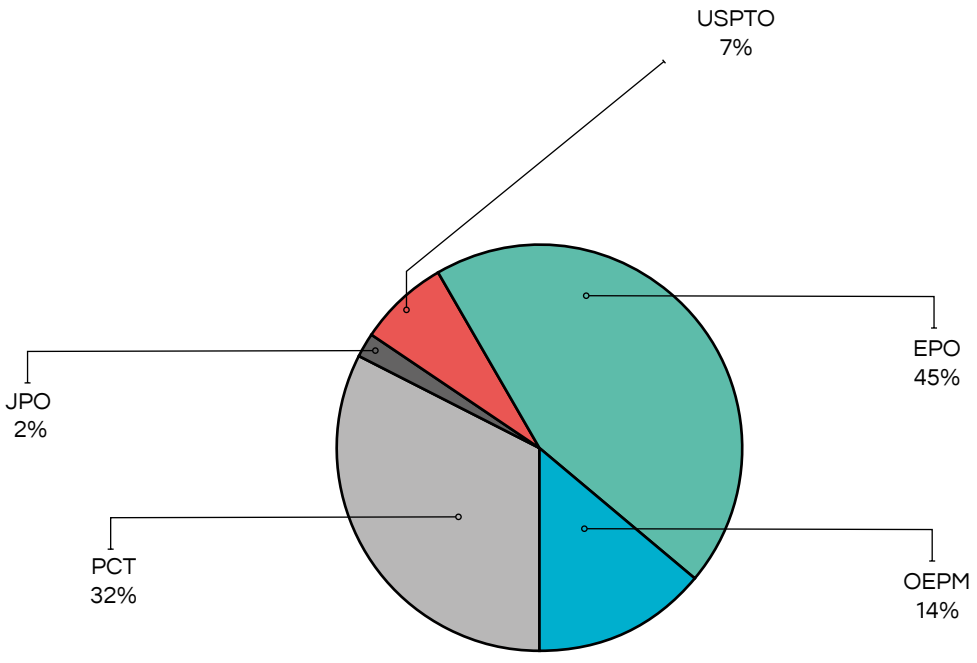
Patents with a Spanish priority claim or stakeholder in the biotechnology sector were identified through the various patent offices (OEPM, EPO, USPTO, JPO and WIPO).
In 2020, as we've seen since 2013, the sector continued to choose to protect its innovations mainly through the European Patent Office (EPO) and with international PCT patents (table 6.2).

Table 6.2. Number of patent applications and patents granted to Spanish biotechnology organisations (2020). Source: Clarke, Modet - FPCM.

Patents issued	OEPM	EPO	USPTO	JPTO	PCT	TOTAL
Applications	78	247	40	13	179	557
Granted	51	155	18	9	(NA)	233
TOTAL	129	402	58	22	179	790

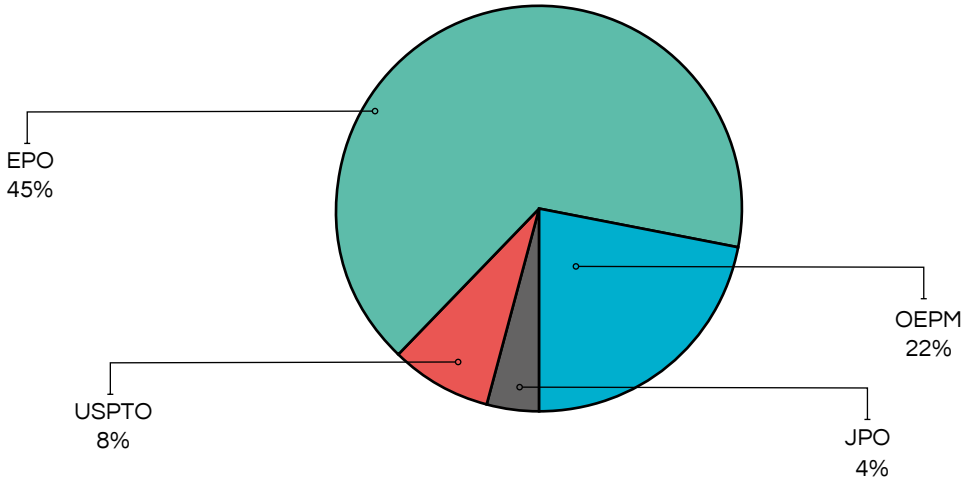
The majority of the sector has chosen to protect innovations on a European level, with 247 patents, and 179 through PCT, while only 78 patents were issued through the Spanish Patent and Trademark Office, nearly the same as the previous year.

Graph 6.4 shows that the highest percentage of patent applications in the biotechnology sector were filed with the European Patent Office, 45%, followed by 32% through international PCT patents, 14% through the Spanish Patent and Trademark Office, and 2% through the Japan Patent Office.



Graph 6.4. Biotechnology patent applications (2020). Source: Clarke, Modet - FPCM.

The patents granted (graph 6.5) follow the same trend as the applications. 66% of patents were issued by the European Patent Office, 22% by the Spanish Patent and Trademark Office, 8% by the United States Patent and Trademark Office and 4% by the Japan Patent Office.

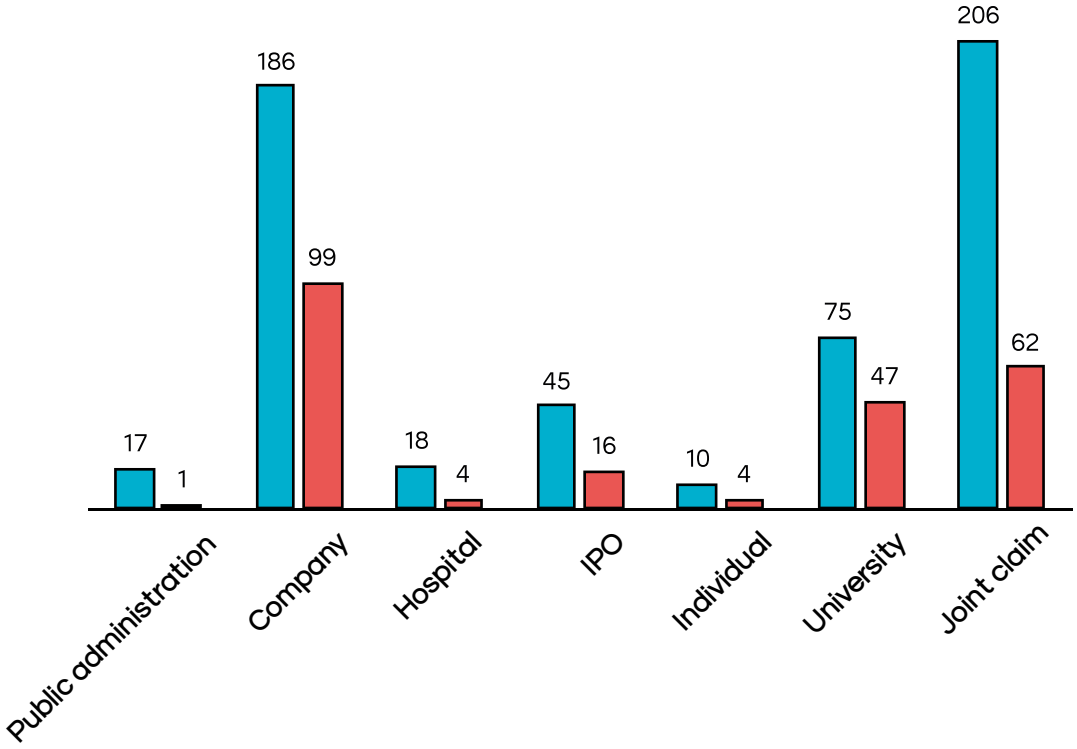


Graph 6.5.
Biotechnology patents issued (2020).
Source: Clarke, Modet- FPCM.

The biotechnology sector patents in collaboration, with nearly 200 joint patent applications.

Joint claims, or collaborative patenting, with 206 applications and 62 patents granted, is the main pathway for protecting biotechnology innovations.

As we can see in graph 6.6, companies continue to be the main claimants, with 186 applications and 99 patents granted.



Graph 6.6.
Holder of patent applications and patents granted (2020).
Source: Clarke, Modet - FPCM.

For over a decade, European and international patents have been increasing, and Spanish patents, decreasing.

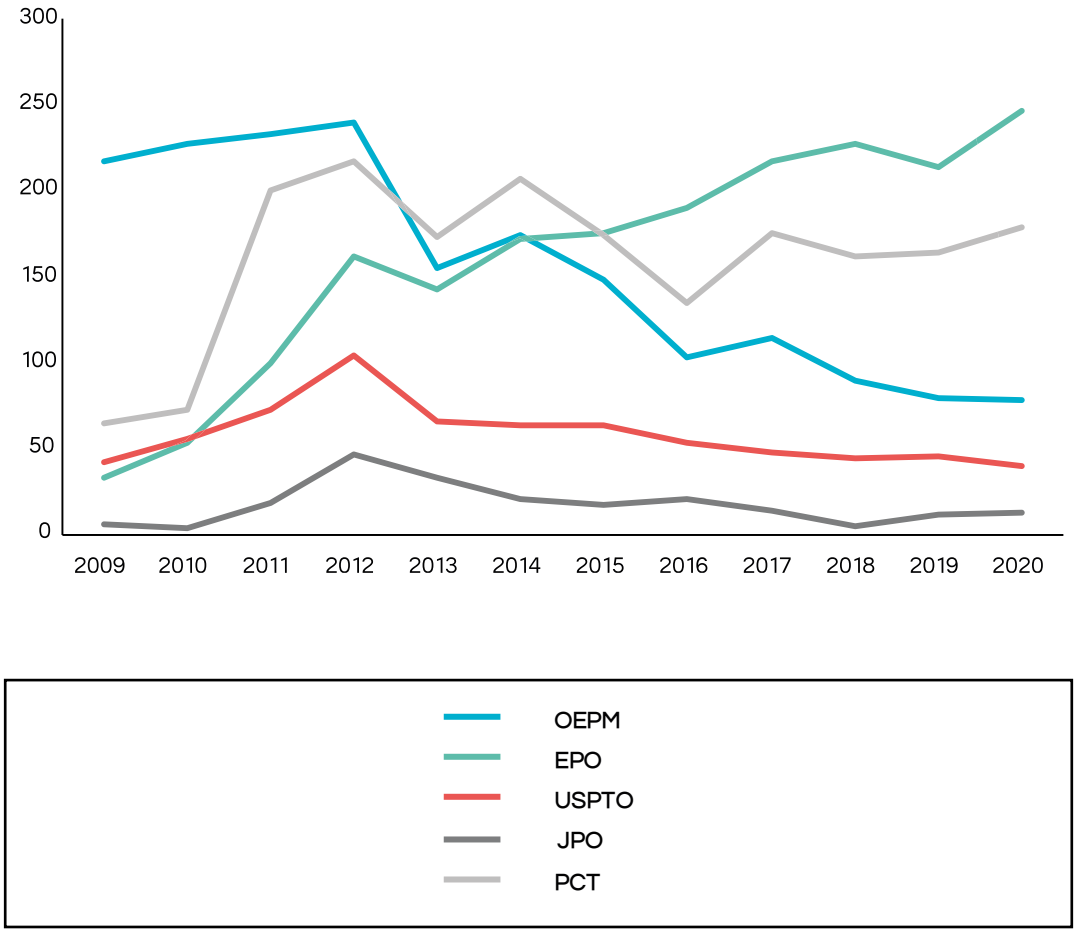
As we've seen for over 10 years, the sector chooses to patent in international and European arenas.

Graph 6.7 shows that the patent applications submitted to the Spanish Patent and Trademark Office have decreased steadily, while PCT or European Patent Office applications have risen. Applications to the US or Japanese patent offices, except for an uptick in 2012, have held stable in recent years.

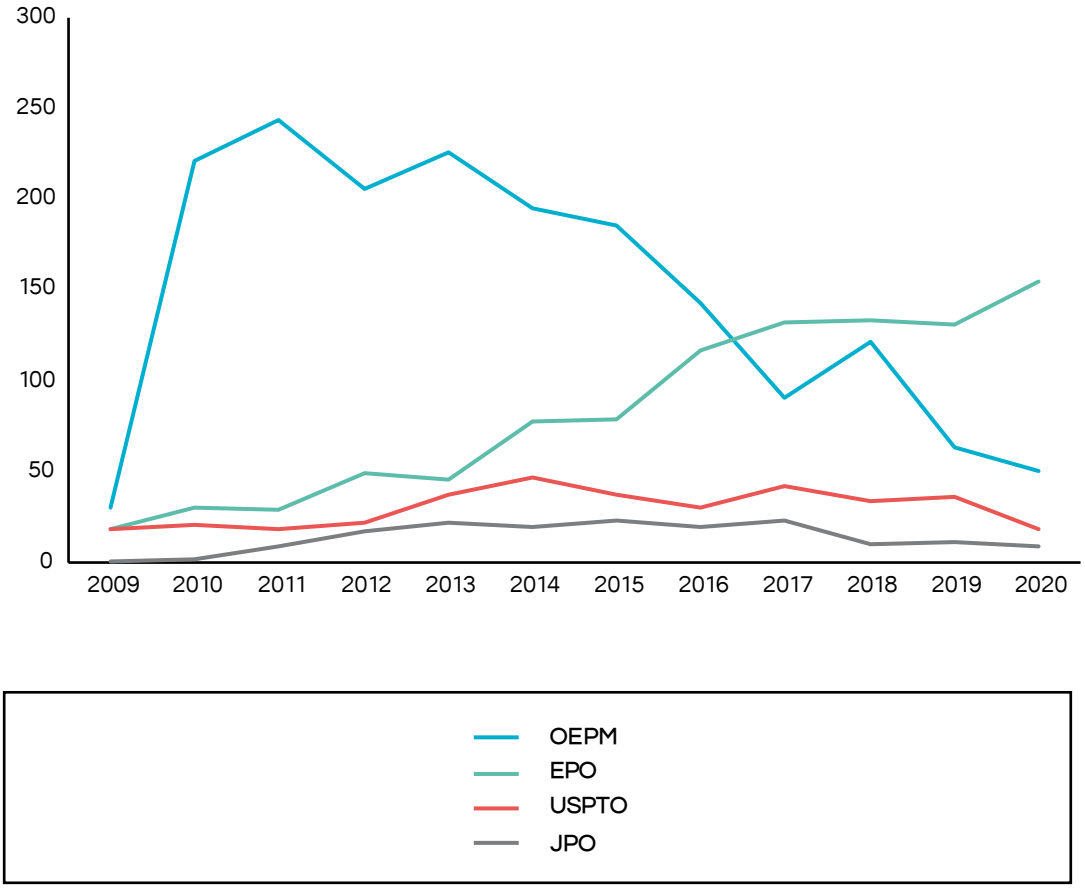
If we compare patent applications submitted to the European Office in 2009 and 2020, we see a seven-fold increase. While there were 33 applications in 2009, 2020 saw a total of 247.

In the case of international patents through the Patent Cooperation Treaty (PCT), over 10 years ago there were only 65, while in 2020 there were 179 applications.

Protection through the Spanish Patent and Trademark Office dropped again, from 217 applications in 2009 to just 78 in 2020, down 64%.



Graph 6.7. Trend of patent applications (2009-2020). Source: Clarke, Modet - FPCM.



Graph 6.8.
Trend of patents granted (2009-2020).
Source: Clarke, Modet - FPCM.

In 2020, the Madrid Science Park Foundation (FPCM) celebrated its 20th anniversary. Over these years, the Park has positioned itself as a benchmark in incubating innovative projects in science and technology and has consolidated its own business model that puts the entrepreneur at the centre of all its efforts and at the top of its list of priorities. To do so, the work of the Park's founding universities, UAM and UCM, and its trustees, CIEMAT, CSIC and the Madrid City Council, has been essential.

Located in the northern part of Madrid, FPCM is in a strategic environment where universities, research centres, industry and companies come together in their commitment to R&D.

Entrepreneurs that choose FPCM find a full catalogue of professional services, including business development, human resources, internationalisation, communication, project management and technology transfer.

Plus, the Park provides quality facilities that are particularly beneficial for the biotechnology sector, as an incubator that mainly focuses on projects in chemistry and the life sciences, with labs, technical services, equipment and common areas, as well as offices and coworking spaces.

All of this aims to ensure the viability of new science/technology companies.
The 81 FPCM member companies comprise a diverse group of projects that are transformative, solid and growing, with a model based on the culture of innovation.

In recent years, FPCM has also been promoting knowledge transfer to market through acceleration programmes for entrepreneurial projects based on science/technology and deep tech. In these programmes, researchers learn to develop and validate their own business and client models with the Lean Launchpad method, doing market interviews. Some examples of these initiatives include the Dinamiza programme with the CSIC, the UAM programme to encourage entrepreneurship among researchers in training and postdocs, and the CaTaPull Madrid programme, in collaboration with the Madrid City Council.

The FPCM Genomics Unit, which specialises in Next Generation Sequencing, Single Cell Sequencing and real-time PCR, has a team of highly qualified professionals that use the most advanced, innovative equipment and technology to provide a comprehensive service that begins with experiment design and culminates with statistical and bioinformatics analysis of the results obtained, for research groups, hospitals, companies, and public and private labs.
In 2020, the Unit carried out 228 experiments for 91 research groups at research centres and IPOs (25% of its activity), technology-based companies (26%), Spanish universities (13%) and hospital research units (36%).

FPCM has been a member of the Enterprise Europe Network (EEN) since 2008. This is the main support network for SMEs with international projection, promoted by the European Commission. With 3,000 professionals from over 600 organisations in 60 countries, EEN provides services that help SMEs grow quickly, such as scouting for commercial alliances, technology transfer deals and access to funding.

Furthermore, ESA BIC Comunidad de Madrid is the business incubation centre for the European Space Agency (ESA) in Madrid. Coordinated by the Madri+d Foundation, ESA BIC offers incentives for business projects and start-ups that use space technology to create products and services outside the field of space. The programme uses FPCM as its business incubator, which is currently home to seven companies.

FUNDACIÓN
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6.3 Advances in development

BIOHEALTH

Advances in studies:

3P Biopharmaceuticals and **Viscofan** announced they had successfully completed the first implantation of the combined drug VB-C01, a collagen membrane patch with allogeneic stem cells from adipose tissue to regenerate heart tissue in patients with ischaemic heart disease.

Ability Pharma announced positive results for its ABTL0812 compound to treat neuroblastoma, and positive results of the phase I/IIa clinical trial on this drug in combination with carboplatin and paclitaxel (chemotherapy) to treat recurring metastatic endometrial cancer.

Almirall announced that ILUMETRI® (tildrakizumab) had shown five-year efficacy and safety in patients with moderate-to-severe psoriasis.

Amgen announced new data from the phase II of the CodeBreaK 100 clinical development programme on sotorasib (AMG 510) in 129 patients with multiple advanced solid tumours and presented the first phase III clinical trial to assess a PCSK9 inhibitor for cholesterol-lowering treatment in paediatric patients with heterozygous familial hypercholesterolemia (HeFH).

Biofabri announced that its new tuberculosis vaccine MTBVAC, designed by the University of Zaragoza as a candidate for universal tuberculosis vaccination and alternative to the current vaccine (BCG), had begun phase III.

InnoUp Farma, the Miguel Servet Foundation and the University of Navarra began a phase I clinical trial to determine the efficacy of an oral immunotherapy based on nanoparticles to treat food allergies (NANOVAC).

Laminar Pharma launched its first paediatric clinical study at Hackensack Hospital in the US, focusing on treating children with neurological tumours.

Minoryx Therapeutics announced positive results of its ADVANCE clinical trial in phase II/III. The study assessed leriglitazone, a novel, selective agonist of PPARγ, in male patients with adrenomyeloneuropathy (AMN), a neurogenerative disease that causes progressive spastic paraparesis and autonomic nervous system dysfunction.

NimGenetics incorporated TrisoNIM NeoSeq into its line of foetal DNA tests using a blood sample from the mother, a qualitative leap forward in non-invasive prenatal genetic diagnostics by including dominant monogenic diseases.

Oryzon Genomics presented positive new data on efficacy from its phase II ALICE trial under way, studying iadademstat in combination with azacitidine in older patients with acute myeloid leukaemia (AML), and a phase II trial studying iadademstat in combination with the standard treatment for small-cell lung cancer (SCLC) in relapsed extensive disease (ED).

Palobiofarma announced positive results of its phase II clinical trial to assess the preliminary efficacy and safety of its A1 adenosine receptor antagonist, PBF-680, in patients with mild to moderate asthma.

Peptomyc, announced it had begun clinical trials in Europe on Omomyc (OMO-103), an inhibitor of Myc, a key gene in the spread of tumour cells.

SOM Biotech kicked off 2020 with positive results from its phase IIa proof-of-concept testing to assess the safety and efficacy of SOM3355, a VMAT2 inhibitor (vesicular monoamine transporter 2), in patients with Huntington's disease.

Regulatory authorisations:

Ability Pharma received FDA and AEMPS approval to begin a clinical trial on its ABTL0812 molecule for pancreatic cancer in Spain and the United States. This same molecule has already been through phase II testing as a first line of treatment for patients with endometrial cancer and squamous cell carcinoma, in Europe.

The FDA approved **Almirall's** Klisyri® (tirbanibulina), an innovative topical treatment for actinic keratosis.

Ascil Biopharm gained approval for a second phase I clinical trial in healthy volunteers with its product APOC | AQ.

Biosearch Life received Bio certification for its probiotic containing *L. fermentum* CECT5716 LC40®.

Oncoheroes Biosciences announced that the US Food and Drug Administration had granted Volasertib orphan drug designation to treat paediatric rhabdomyosarcoma and other rare soft-tissue sarcomas.

PharmaMar and Jazz Pharmaceuticals announced FDA acceptance and priority review for their application for lurbinectedin to treat relapsed small-cell lung cancer.

Expanded capacities:

Algenex inaugurated its new vaccine manufacturing plant in Tres Cantos, which can produce up to 100 million vaccine doses.

The Insud Pharma group's, mAbxience laboratory inaugurated a new production plant for biosimilar monoclonal antibodies in Argentina to treat oncology and autoimmune diseases like rheumatoid arthritis.

In early 2021, **VIVEbiotech** announced it was expanding its facilities to ramp up production and further optimise its production processes for lentiviral vectors.

ZeClinics created the spin-off **ZeCardio**, a platform to analyse and validate the impact of drugs and genetic heart conditions on zebrafish larvae.

AGRIFOOD

ADL Bionatur solutions received authorisation for the health registration prior to GMP-food certification to manufacture food additives and aromas through fermentation.

The **AINIA** PROALT II project is researching alternative protein sources such as lemna, insects and single cell proteins (SCP).

Biosearch successfully concluded stability testing on its finished product with a probiotic strain (*Lactobacillus coryniformis* CECT5711 K8), demonstrating its efficacy in reducing viral respiratory infections.

Natac announced promising results of its growth and immunity testing in young salmon under the Aquolive project and completed the Innoleaf project, through which it obtained the knowledge to develop a new generation of ingredients derived from olive leaves.

Plus, in Hervás (Extremadura) the company opened a multi-product factory that will combine several extraction technologies. It will produce plant extracts both from local botanical species like the olive and the grape and from species grown in areas further afield.

INDUSTRIAL

Agarose Bead Technologies (ABT) added the Exorose ™ Beads to its catalogue, which are used for isolation of extracellular vesicles (EVs), including exosomes.

AINIA, through its REFUCOAT project, is working to develop new bio-based packaging that incorporates hybrid coatings with gas barrier, antioxidant and antimicrobial properties to be used in films and trays for food.

CICYTEX obtained a biomaterial with bioplastic and fibres from the kenaf plant, a non-edible crop, as an alternative to non-renewable plastics.

Cultiply patented a smart device that can cut fermentation costs for producing wine and beer by up to 90%.

6.4 Products and services launched to market: Up 70% thanks to Covid-19 products

This section includes a list of the products and services launched to market and some of the most noteworthy deals to licence or distribute these products and services.

Licensing and distributions deals.

AbbVie signed several deals with Chinese companies like I-Mab to commercialise lemzoparlimab and Jacobio to commercialise SHP2 inhibitors, which target a key node in cancer and immune cells.

Archivel Farma and Ruti Immunotherapeutics signed a licensing deal to develop and commercialise the RUTI vaccine for Covid-19 and other viral infections.

Biohope Scientific Solutions and Italian firm TEMA Ricerca partnered to commercialise Immunobiogram ©, a kidney transplant drug, in Italy.

Bioibérica signed a deal for Bayer Animal Health and Barentz to market its animal products in Europe and with Vetnostrum for Asia.

Laboratorios Rubió expanded its commercialisation deal with OWL Metabolomics for the OWLiver test to include the US.

Minoryx established a deal with Chinese company Sperogenix Therapeutics to commercialise leriglitazone, a treatment for Friedreich ataxia.

PharmaMar expanded its deal with Jazz Pharmaceuticals for that company to license Zepzelca™ (lurbinectedin) in Canada. Plus, the company signed a commercialisation deal with Swedish firm Immedica Pharma for Eastern Europe, the United Kingdom, Ireland, the Nordic countries and countries in the Middle East.

The company continues forging partnerships with other companies around the world to commercialise Yondelis® (trabectedin), like STADA for the Middle East and North Africa and R-Pharm in Asia.
It also closed deals with Onko Ilac San ve Tic in Turkey, ADIUM Pharma in South America, TTY Biopharm in several Asian countries, Key Oncologics in South Africa, Megapharm in Israel, and Valeo Pharma in Canada.

Plant Response Biotech closed a distribution deal for the biostimulants Cybelion® and Neptunion® with ADAMA Spain.

Table 6.3 shows the full list of all the products and services, along with the indication for each one, and 6.9 shows the breakdown by areas of activity.

Organisation	Name of product/ service	Indication of product/service
AbbVie	Skyrizi®	Injectable IL-23 solution for adult patients with moderate-to-severe plaque psoriasis and candidates for systemic therapy.
AbbVie	Rinvoq®	Oral treatment using selective, reversible JAK inhibitor for adults with moderate-to-severe active rheumatoid arthritis.
AbbVie	Venclyxto® + rituximab	New combination of drugs with a 24-month fixed duration to treat patients with relapsed chronic lymphocytic leukaemia (CLL).
Agrenvec	Recombinant SARS-CoV-2 antigens	With CBGP, affordable mass production of recombinant SARS-CoV-2 antigens for diagnostic use.
Ainia	Detecting SARS-CoV-2 in wastewater	Analytical service for public bodies and companies for early detection of increased incidence in a population or group.
Ainia	Omic services	Proteomics, lipidomics and metabolomics services, as well as detecting traces of certain molecules.
Ainia	Genetic engineering of microorganisms	Proprietary bacterial chassis to obtain recombinant strains.
Ams Lab	COVID-19 Control System	Kits to detect Covid-19 on surfaces and in workspaces.
Bioibérica	Condrovet® Force HA Large Breeds	Tablets to provide nourishment for growing joints, particularly for dogs predisposed to hip dysplasia.
Bioibérica	Condrovet	Tablets to provide nourishment for growing joints in dogs over 25 kg predisposed to hip dysplasia.
Bioibérica	Atopivet® Oral suspension	To promote the recovery of the skin barrier and decrease skin dehydration in animals.
Biolan Health	COVID-19 IgG/IgM Rapid Test Cassette	Antibody test to detect SARS-CoV-2 antibodies quickly, easily and precisely in people who are or have been infected with the virus that causes Covid-19.
Biosearch	Smartjoint ™	Natural extract of green nettle (*Urtica dioica L.*) with a unique standardisation on the market of 1% caffeoylmalic plus 0.4% chlorogenic to relieve joint pain and inflammation.
Biosearch	Elderpro ™	Natural product with elderberry (*Sambucus nigra L.*) standardised at 0.15% anthocyanosides and Reishi (*Ganoderma lucidum*) standardised at 35% polysaccharides, to stimulate the immune system.

Biotools		Equipment-specific extraction kits.
BTI Biotechnology Institute	CORE® line of implants	Expanded line of conical dental implants.
BTI Biotechnology Institute	Universal Plus® new implants	Expanded line of conical dental implants.
Canvax Biotech	CVX-Mag™ Viral RNA Extraction Kit (CE-IVD)	Viral DNA extraction kit based on magnetic beads, compatible with most automatic equipment for this technology.
Canvax Biotech	CVX™ Viral RNA Extraction Minispin Kit (CE-IVD)	Viral DNA extraction kit based on MiniSpin Columns, compatible with most automatic equipment for this technology.
Canvax Biotech	HigherPurity™ Viral RNA Extraction Kit (RUO)	Purification of viral DNA and RNA from cell–free samples such as serum, plasma and cerebrospinal fluid.
Canvax Biotech	CVX™ Virus Collection & Processing Kit	Collection and transportation of saliva specimens prior to direct PCR.
Celgene	Zeposia	Sphingosine-1-phosphate (S1P) receptor modulator approved for patients with RMS (relapsing multiple sclerosis) and active MS.
Cellus	BSL-2 Laboratory	Clinical diagnostics laboratory accredited by Seremi and ISP for molecular diagnosis of Covid-19 using RT-qPCR.
Cultiply	Vitaply®/Lactoply®	Industrial growth media to generate yeast or lactic bacteria biomass, respectively, with applications in the food industry.
Genómica	COVID-19 Respiratory Combo	Multiplex real-time PCR kit designed to differentially detect SARS-CoV-2, Influenza A, Influenza B, and respiratory syncytial virus (RSV).
Genómica	CLART® COVID-19	Multiplex RT-PCR where SARS-CoV-2 genes are amplified followed by hybridisation with specific probes in low-density microarrays.
Genómica	Covid-19 diagnostic kit	Diagnostic kit for Covid-19.
Gilead	Veklury (Remdesivir)	Antiviral activity both in vitro and in vivo against SARS and MERS, clinically tested at Spanish hospitals.
Ibima	External Quality Assurance Programme for Advanced Therapy	Periodic assessment to ensure efficacy and safety of advanced therapy drugs.
Imereti	GMP Plant	CMO for third parties: Manufacturing sterile drugs for human and veterinary use, and researching drugs in regenerative and restorative medicine.

Imereti	Cytometry	Flow cytometry services.
Imereti	VCELL-a	Comprehensive platform to model biological cell systems using a central database to develop cell therapy for osteoarthrosis.
Ingenasa	VIRSeekRNAExtractor-Food	RNA Extractor kit for extraction of viral RNA from environmental samples from food.
Ingenasa	VIRSeek SARS-CoV-2 Screen	SARS-CoV-2 detection kit from VIRSeek that enables rapid screening for the E-gene, which encodes the envelope surrounding the viral shell for surfaces and food.
Ingenasa	VIRSeek SARS-CoV-2 Ident 2	One-step real-time RT-PCR to specifically detect the RNA-dependent RNA polymerase (RdRP-gene) of the SARS-CoV-2 virus in food and environmental surfaces.
Ingenasa	INgezim COVID 19 DR: ELISA	Double recognition ELISA kit to determine total SARS-CoV-2 antibodies in serum samples. Capable of detecting all isotypes (IgG, IgM and IgA) in a single sample.
Ingenasa	INgezim COVID 19 CROM	Quick immunochromatography test to determine total SARS-CoV-2 antibodies in blood and serum samples.
Ingenasa	INgezim COVID 19 CROM (Easy)	Immunochromatography strips to determine total SARS-CoV-2 antibodies in blood and serum samples.
Ingenasa	GSD NovaPrime® SARS-CoV-2 (COVID-19)	Multiplex real-time PCR with CE-IVD marking for direct qualitative pathogen detection of the coronavirus (SARS-CoV-2), particularly useful in the early stage of a viral infection.
Ingulados	INGUBAL	Nutritional supplement for animal feed, alternative to antibiotics.
Immunostep	ELISA Anti-SARS- Cov-2 kit	Kit for the precise detection and measurement of either IgG or IgA antibodies against the Mpro (3CLpro) protein of SARS-CoV-2 virus.
Immunostep	SARS-CoV-2 Multiplex IgG+IgA test	Multiplex, microsphere-based, highly sensitive and specific assay that measures the presence or absence of antibodies against four different SARS-CoV-2 antigens simultaneously.
Iul		Rapid test reader, adaptable to any test (antigen, antibody, etc.) with connectivity to send results in real time.

Labgenetics	Arquimea Medical	Active Infection Diagnostic Test (PDIA) for SARS-CoV-2 associated with the disease Covid-19, using all sorts of diagnostic tests (PCR, Antigen and Antibody).
Laboratorios Rubió	Rubifen Retard® modified-release capsules	ADHD medication.
Laboratorios Rubió	Fosquel® 800 mg	Drug to control hyperphosphatemia.
Laboratorios Rubió	Dolquine	Drug with the active pharmaceutical ingredient hydroxychloroquine, which has been tested in a ground-breaking clinical trial to limit the spread of Covid-19.
Laboratorios Rubió	Atamax®	ADHD medication.
Leitat		Generating monoclonal antibodies for diagnostics and therapies.
Miltenyi Biotec	MACSima ™	Imaging platform using MICS (MACSima TM Imaging Cyclic Staining) technology that, together with a broad spectrum of recombinant antibodies, allows for analysis of hundreds of markers on a single sample and multiple samples at a time.
Myriad Genetics España	Vectra ®	Blood test to objectively measure inflammation caused by rheumatoid arthritis.
Myriad Genetics España	GeneSight ®	Kit to collect DNA samples and analyse how genes could affect drug results.
Myriad Genetics España	myChoice CDx	Complementary diagnostic tests to determine HRD status in patients with advanced ovarian cancer.
Natac	OleaFall	Natural extract to support the immune system.
Natac	Full Spectrum Olive	Natural extract to support the cardiovascular system.
Natac	Full Spectrum Grape	Natural extract for antioxidant support.
Natac	Full Spectrum Saffron	Natural extract to support emotional and eye health.
Natac	Full Spectrum Artichoke	Natural extract to support the detoxification system.
Natac	Full Spectrum Hops	Natural extract to alleviate symptoms associated with perimenopause and menopause.

Natac	Pomolive	Natural extract to improve metabolic syndrome.
Natac	Endolive	Natural extract to improve cardiovascular health.
Nostrum Biodiscovery	AquaPELE	Tool to predict the location of water molecules at the bond between a drug and the therapeutic target to design better drugs.
Nostrum Biodiscovery	pyDock	Tool to predict protein-protein interactions to design better drugs.
Nostrum Biodiscovery	FragPELE	Designing ligands (drugs) by growing new chemical entities computationally using the proprietary PELE tool.
Nostrum Biodiscovery	PluriZymes	In silico enzyme design for industrial use with multiple active sites.
Nucaps	NanoresveratrolTM	Nanocapsules of resveratrol loaded on zein nanoparticles (corn protein) to improve respiratory symptoms of Covid-19 (fibrosis, pneumonia, etc.).
Nucaps	Encapsulated probiotics	Encapsulation of probiotics with food proteins resistant to thermal processes.
One Way Liver	OWLiver F2+	Diagnosis of NASH and high levels of fibre > 2.
Operon	Real SARS-CoV-1/2	Rapid, sensitive test to screen for the E-gene of the SARS-CoV-2 through RT-PCR on RNA from human clinical samples.
Operon	Simple /Stick Ag SARS-CoV-2	One-step immunochromatographic tests for qualitative detection of the SARS-CoV-2 antigen from nose or throat samples.
Operon	Simple IgA/IgM/IgG SARS-CoV-2	Quick immunochromatography test to determine IgA, IgG and IgM SARS-CoV-2 antibodies separately in blood and serum samples.
PharmaMar	Zepzelca TM	Oncology drug approved in the US to treat metastatic small-cell lung cancer.
Plant Response Biotech	Neptunion®	Biostimulant that enhances plant tolerance to seasonal abiotic stress conditions, such as drought, thermal stress and salinity.
Plant Response Biotech	Cybelion ®	Extract made from mycelial cellular membranes that stimulates plant growth, strengthens the crop and enhances the yield and quality of the harvest.
Progenie Molecular	RealCycler® CORO	Kit of reagents to detect SARS-CoV-2 RNA in clinical samples.

Progenie Molecular	RealCycler® COROFLUR	Kit of reagents for in vitro diagnostics to detect RNA from SARS-CoV-2, Influenza B, Respiratory syncytial virus and Influenza A.
Promega Biotech Ibérica	XpressAmp™	Reagents for direct amplification of Covid-19.
Promega Biotech Ibérica	OncoMate™ MSI	PCR-based system to determine microsatellite instability (MSI) status in solid tumours.
Promega Biotech Ibérica	Spectrum Compact CE	Benchtop instrument for Sanger sequencing and fragment analysis through capillary electrophoresis.
Promega Biotech Ibérica	Lumit™ Dx SARS-CoV-2 Immunoassay	Qualitative in vitro diagnostic test to detect antibodies to SARS-CoV-2 in serum or plasma using bioluminescence.
Promega Biotech Ibérica	SARS-CoV-2 RT-qPCR Kit for Wastewater	Test to extract and detect SARS- CoV-2 RT-qPCR in wastewater.
Promega Biotech Ibérica	Metabolism -Glo™ Assay	Bioluminescent assay to measure triglycerides, glycerol and/or cholesterol in cell culture lysates and other biological samples, such as cell culture medium, serum and tissue homogenates.
Roche Diagnostics	Elecsys® Anti-SARS-CoV-2.	Immunoassay for the in vitro qualitative determination of antibodies (including IgG) to the Severe Acute Respiratory Syndrome 2 (SARS) coronavirus (SARS-CoV-2) in human serum and plasma.
Roche Diagnostics	Test cobas® SARS-CoV-2	Real-time PCR test for qualitative detection of SARS-CoV-2 in nasopharyngeal and oropharyngeal swabs.
Roche Diagnostics	Test cobas® SARS-CoV-2 & Influenza A/B	Real-time PCR test for qualitative detection of SARS-CoV-2, Influenza A and Influenza B in nasopharyngeal and oropharyngeal swabs.
Roche Diagnostics	SARS-CoV-2 Rapid Antibody Test	Reliable, rapid chromatographic immunoassay for qualitative detection of antibodies to SARS-CoV-2 in nasopharyngeal samples.
Sistemas Genómicos	Ascires® SGKIT COVID-19 PCR Fast	Rapid diagnostic test to detect SARS-CoV-2 genetic material using RT-PCR in 40 minutes at point of care. Multiplex One Step
Sistemas Genómicos	Ascires® SGKIT COVID-19 Multiplex One Step PCR	Rapid diagnostic test to detect SARS-CoV-2 genetic material using RT-PCR.
Sistemas Genómicos	Ascires® PCR 2GO SALIVA	Rapid diagnostic test to detect SARS-CoV-2 genetic material using RT-PCR from a saliva sample.

Sistemas Genómicos	Ascires® Surface Check	One-step multiplex kit designed to detect SARS-CoV-2 in surface samples using RT-PCR.
Sistemas Genómicos	PGT-a GeneSGKIT	PGT-A kit for preimplantation chromosomal study of embryos to detect aneuploidy, when the embryo has an abnormal number of chromosomes.
Sistemas Genómicos	dPCR service for tumour and liquid biopsies	dPCR service for tumour and liquid biopsies of the main genes involved in cancer, as well as the most prevalent mutations.
Sistemas Genómicos	Myeloid Leukaemia NGS Panel	Myeloid Leukaemia NGS Panel to identify genetic markers to guide diagnosis, prognosis and treatment in oncology patients.
Vitro	SARS-CoV-2 RT-PCR	TRT-PCR diagnostic tests for SARS-CoV-2.
Vitro	RESPIPLEX RT-PCR	RT-PCR diagnostic tests for RSV, RHV, MPV virus.
Vitro	RESPIRATORY DNA-FLOW CHIP	In vitro test to simultaneously detect the Covid-19 virus and 20 other respiratory pathogens.
Vitro	RT-PCR FluCovid	In vitro test to simultaneously detect the Covid-19 virus and 20 other respiratory pathogens.
Vitro	Opentrons	Traceability software for Opentrons OT-2 robots.
ZeClinics	DevTox	Service to analyse teratogenicity of compounds.
ZeClinics	Endocrine Disruption Assay	Service to analyse the endocrine disruption potential of compounds.
ZeClinics	Optimized KI	Service to generate optimised KI genetic models.
ZeClinics	CRISPANTS	Innovative service to generate genetic models more quickly.

Table 6.3.
Products and services launched to market by AseBio members in 2020.
Source: AseBio.

We developed the first rapid coronavirus test manufactured wholly by a Spanish company.

In 2020, Eurofins Ingenasa was an example of the power of biotechnology in our country to transform and respond to adversity.

For over two decades, the biotechnology sector has developed innovative solutions that have helped protect us from healthcare crises like the one we are currently experiencing, but also to tackle challenges like the ageing population and infectious diseases in humans and animals, sustainable food and the climate emergency.

Now, however, is when all the cumulative knowledge and hard work of these past years are bearing fruit.

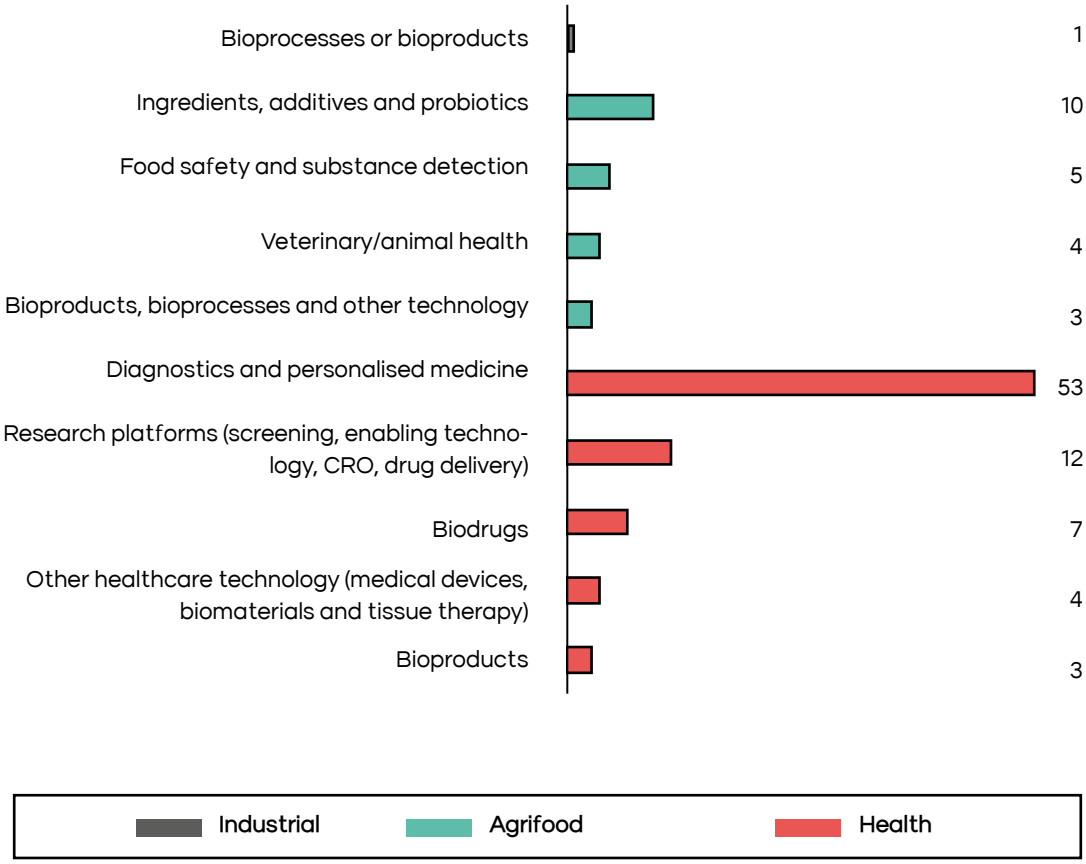
The SARS-CoV-2 healthcare emergency has highlighted the value of the biotech sector's great agility and versatility, as it has been able to refocus its capacities quickly to produce everything from the first tests to vaccines.
Eurofins Ingenasa is a Spanish company that has specialised in developing, manufacturing and commercialising diagnostic tests for animal health and food safety for over 35 years.
The pandemic, over a year ago, led us to transform our experience and expertise in order to put them at the service of public health. During the pandemic, we set up a new division for human diagnostics to fight SARS-CoV-2. We were the first company to manufacture the first 'made in Spain' rapid tests to detect Covid-19 antibodies, putting most of our resources and knowledge towards serving public health.
One year later, we have the capacity to produce one million antibody tests and four million antigen tests each month.

Our experience in detecting diseases caused by viruses, which affect a high percentage of the animal population, has been key in Eurofins Ingenasa's ability to react. This is how we have been able to apply biotechnology techniques such as genetic engineering to develop some of the best tests on the market in terms of specificity and sensitivity.

Public health has become the focus of many biotech companies, which faced with the healthcare emergency have pivoted their efforts to find a quick, effective solution, understanding that only having as much information as possible now will we be able to offer the best response in the future. It is precisely this transversal nature that gives our sector its great ability to transform.

This cannot be explained, however, without years of research and innovation to understand the molecular foundations of genetic engineering and recombinant proteins, or without years of investment in R&D to come up with effective biotechnology drugs to treat Covid-19 and other conditions like Ebola, cancer, arthritis, hepatitis C and HIV.
The knowledge and experience of the biotechnology sector and the hard work put in over decades of research are the foundation that has allowed us to respond to this pandemic. It is time to give our science and innovation system a new push and align it with the challenges we are now facing in order to build a better future.

eurofins | Ingenasa



Graph 6.9.
Breakdown by area of activity for products and services launched to market by AseBio members. Source: AseBio.

Biotechnology in the fight against Covid-19

In 2020, we identified 102 new products or services launched to market by AseBio members, which is 42 more than in 2019.

This increase is mainly due to the role biotechnology has played in the fight against Covid-19. In 2020, biotechnology firms pivoted their activity and launched 40 products or services to diagnose, treat or predict this disease.

These 40 products make up 39% of all the products launched last year. The main increase has been in diagnostic and personalised medicine in the healthcare category, going from 12% of all launches to approximately 52% in 2020.

Algenex, a new paradigm for developing and manufacturing vaccines and biological products

In September 2020, Algenex inaugurated its new facilities in Tres Cantos and took another step in consolidating the project it began 15 years ago, which aims to address some of the biggest challenges in public health, consolidating a disruptive model for manufacturing biological products and biocomponents.

In just five months, investing under €2 million, we opened a plant that can provide solutions for the pharmaceutical industry in terms of scalability, versatility and development time.
It can currently manufacture roughly 50 million vaccine doses, which can easily be doubled to 100 million in a short period of time.

This entails substantial benefits at reduced costs compared to traditional production systems and gives the scientific community and the people around the world access to biotechnology products and biocomponents.
And we've done so using the tools we find in nature, replacing traditional bioreactors with living organisms that simplify and optimise production of the molecules we need.

Algenex has come a long way in terms of technology to properly program the cells of our insect, *Trichoplusia ni*, and develop all the industrial procedures that make CrisBio® technology a turning point in the safe supply of a wide variety of biological products.

We have a long history in the veterinary field, where we have carried out projects with large companies in the sector, putting us on the threshold of gaining European authorisation for the first vaccine manufactured with CrisBio® technology, which we hope to get this June.

But our commitment to the current situation has meant we are also focusing our efforts on human health, where we think we can have a significant impact based on the advantages of CrisBio® and the results obtained through our research with zoonotic viruses, like the flu and Covid-19.

The final result of our work at Algenex is to generate a real proposal for mass production of vaccines and other biological products for our country, which was previously a pipe-dream.
And we have achieved this with a technology that doesn't require huge facilities yet has quick production capabilities that allow for unlimited scalability and can manufacture enough to immunise the whole population very quickly.

Joining forces

The situation we have been facing with the Covid-19 pandemic has highlighted the need to join forces, with public and private institutions working hand in hand for public health. As a country, we must put up a unified front that demonstrates our leadership in research, and that is not tarnished by funding issues or lack of organisational coordination.

We firmly believe the biotechnology sector can lead the change we need in 21st-century society.
After a global pandemic, now is the time when all companies in the biomedical arena can do our part to transform the driving force behind our country's economy, generating tens of thousands of quality jobs.

By making it faster and easier to incorporate innovation into the healthcare system and through public-private partnerships, we will see better health results and the economy as a whole will be more efficient and competitive.

New healthcare emergencies caused by infectious agents like this coronavirus will become more frequent. Faced with this outlook, we must be able to get quick, affordable solutions to the market. Nowadays, in Spain we don't have the capacity to manufacture human vaccines, which means we must invest and commit to creating a strong business fabric in this field.

This is the time and these are the conditions in which to promote a technology platform for industrial production that ensures we can supply vaccines for the whole Spanish population and help mitigate future global pandemics. A platform that brings together everything we have to offer in research and knowledge regarding viruses, as well as therapeutic and preventive approaches to them, plus the large-scale production capacity required in emergencies. At Algenex we offer our CrisBio® technology for this much-needed collaboration to help quickly and affordably manufacture millions of vaccine doses.

Claudia Jiménez
General Director
Algenex SL

ALGENEX
Transforming Protein Production

COLLABORATION AND INTER-NATIONALISATION

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COLLABORATION AND INTERNATIONALISATION

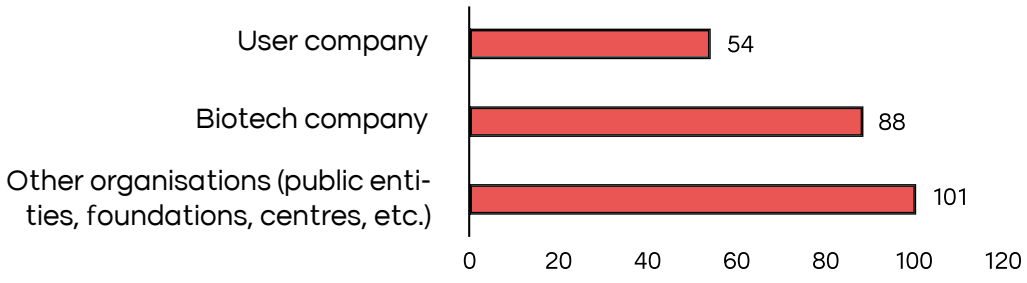
7.1 Alliances

AseBio compiles all the partnerships or collaborations that biotechnology companies take part in with other companies for business development in biotechnology.

Biotech firms forged 59% more partnerships than in 2019 and 40% of the alliances in 2020 were with organisations from the public sector.

In 2020, there were a total of 246 partnerships, up 59% from the 155 reported the previous year.

Biotechnology companies took part in 101 partnerships with an entity from the public sector, a foundation or technology centre, 88 with another biotechnology company and 54 with a company that uses biotechnology (graph 7.1).

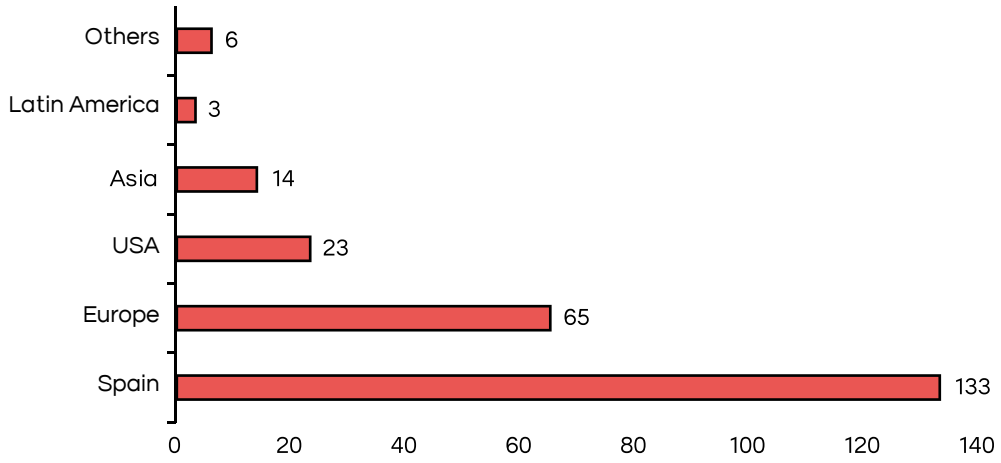


Graph 7.1. Breakdown of alliances in the Spanish biotechnology sector in 2020 by partner profile. Source: AseBio.

In 2020, 45% of all alliances were forged with international partners.

In addition to the total number of agreements, the analysis includes the type of entity, country of origin for entities the sector forges alliances with and the goal of those partnerships.

45% of all alliances AseBio companies forged were with international partners, mainly in Europe (graph 7.2). Additionally, there were 23 partnerships involving organisations from the US, 14 with entities from countries in Asia and three in Latin America.



Graph 7.2.
Breakdown of alliances in the Spanish biotechnology sector in 2020 by partner origin.
Source: AseBio.

Most of the partnerships were set up for R&D and clinical development.

Graph 7.3 shows that 110 of the alliances were aimed at clinical development or field trials, 79 on the preliminary phase, R&D; and 48 of the partnerships were for product marketing or distribution purposes.

Thirty-one of the deals were about production and four were concerning regulatory or industrial protection issues.

Graph 7.3.
Breakdown of alliances in the Spanish biotechnology sector in 2020 by purpose of the alliance.
Source: AseBio.

Alliances in the fight against Covid-19

It is noteworthy that 63 partnerships were forged to tackle the Covid-19 pandemic.
These collaboration agreements are one of the main causes of the increase in the number of partnerships biotechnology member companies forged last year.

COLLABORATING TO DIAGNOSE AND PREDICT COVID-19

Agrenvec, with CBGP and BIOD, worked to develop diagnostic kits.

Atrys Health, in collaboration with researchers at the Complutense University of Madrid and the University of Granada, worked to develop a portable diagnostic device for points of care based on graphene technology, which will provide a highly reliable Covid-19 diagnosis in under 15 minutes. Plus, with the Vithas Foundation and **Leitat**, they studied individual genetic profiles of human leukocyte antigen for sensitivity/resistance to infection, to be able to predict how the disease will progress.

BIOLAN, through its health division OSASEN, and CIC bioGUNE began collaborating to launch a new antibody test to market, the OSAtest-IgG/ IgM detects SARS-CoV-2 antibodies in people who have been or are infected with Covid-19

Bionos Biotech, Hospital La Fe and Carlos III Health Institute, collaborated on an epidemiological project to determine the prevalence of Covid-19.

Crazy Science & Business with the Centre for Molecular Biology Severo Ochoa did research with a biomarker to provide a prognosis of the severity of Covid-19.

CRG worked with ISGlobal, the International Health Service at Hospital Clinic and Hospital Sant Joan de Déu on a hospital project to determine the seroprevalence of SARS-CoV-2 and a platform to discover the factors that protect children against Covid-19.

Ferrer, Hospital del Mar and technology company Bismart partnered to develop data-mining and artificial intelligence tools to analyse and detect common traits in patients with Covid-19.

Immunostep worked with **CSIC** to launch two diagnostic kits to market.

Leitat partnered with Greenaltech and IFAE to develop a model animal for pulmonary fibrosis, one of the side effects of Covid-19, and a photonic diagnostic tool to quantify viral RNA.

COLLABORATING TO FIND A TREATMENT FOR COVID-19

AbbVie worked with Harbour BioMed, Utrecht University and Erasmus Medical Centre to search for a treatment using a monoclonal antibody.

ABT-Agarose Bead Technologies provided purification resins to fight Covid-19 at the Spanish National Centre for Biotechnology.

Aptatargets, with Ramón y Cajal Hospital and La Princesa Hospital, studied ApTOLL in patients in hospital with Covid-19 that are prone to an uncontrolled inflammatory process.

Biomar with the University of Colorado worked to find active pharmaceutical ingredients to fight SARS-CoV-2 from the Biomar compound collection.

Biosearch Life carried out a clinical trial with Virgen de las Nieves Hospital and San Cecilio Hospital to assess the effects of taking a strain of probiotics on the incidence and severity of Covid-19 in healthcare staff and to assess the effects of taking *Lactobacillus coryniformis K8* on incidence in the elderly.

The MEDINA Foundation worked with the University of Granada and the Catholic University of Murcia on

SARS-CoV-2 budding inhibitors as an antiviral treatment for Covid-19 and with the CSIC to implement a high-performance screening platform to discover new anti-SARS-CoV-2 compounds.

Grifols worked with the Biomedical Advanced Research Development Authority (BAR- DA), Food and Drug Administration (FDA), NIH/NIAID, Emergent BioSolutions, CSL Behring and Takeda Pharmaceuticals on the ITAC study to determine whether administering anti-coronavirus convalescent plasma at the onset of symptoms could boost patients' antibody response to the virus, reducing the risk of serious disease and death.

Histocell, Cruces Hospital and Jiménez Díaz Foundation carried out a study on cell therapy drug HC016 to treat acute lung damage in Covid-19 patients.

Imdea Alimentación, with the Autonomous University of Madrid and Infanta Sofia University Hospital, worked on a clinical trial to validate the effects of a nutritional formula (LIPCHRONIC) on preventing infections caused by the coronavirus and other pathogens in oncology patients.

Ingulados with the University of Extremadura studied the immune response in the respiratory epithelium measured using bioactive components from bacteria.

Laboratorios Rubió, Germans Trias i Pujol University Hospital and the Fight Aids Foundation conducted a clinical trial to reduce the spread of Covid-19 using DOLQUINE, the main active pharmaceutical ingredient of which is hydroxychloroquine.

SOM Biotech and the Ewha Womans University in South Korea studied whether the company's drug SOM0061 could act as a 3CL protease inhibitor for SARS- CoV-2, SARS-CoV and MERS-CoV viruses.

COLLABORATING TO FIND A VACCINE FOR COVID-19

3P Biopharmaceuticals is partnering with Osivax to develop a Covid-19 vaccine candidate, OXO- CoV.

InnoUp Farma is working with the University of Navarra on an oral vaccine for SARS-CoV-2 using nano-particles.

Ruti Immunotherapeutics is doing a clinical trial with six hospitals in Argentina to assess the efficacy of the RUTI® vaccine in protecting against SARS-CoV-2 infection in at-risk individuals.

Sylentis is working with **IQS** and the Foundation for Biomedical Research Management of Cádiz on the CoviNanoVax project that seeks to develop an mRNA vaccine.

COLLABORATING TO MANUFACTURE COVID-19 VACCINES

Biofabri reached an agreement with Novavax to manufacture the antigen for the Novavax vaccine for Europe. Plus, they also announced they will be in charge of packaging the vaccine for the Coalition for Epidemic Preparedness Innovations (CEPI).

Reig Jofre will be in charge of filling the vials with the active pharmaceutical ingredients for the Janssen Pharmaceuticals vaccine.

mAbxience, the biotechnology unit of the Insud Pharma group, is filling and packaging the Oxford/AstraZeneca vaccine.

THE DISRUPTION OF COVID-19 AND BIOTECHNOLOGY

In 2020, due to the Covid-19 pandemic, our lives have been turned upside-down like never before. Health, economy and human relations have been hit hard although, thanks in large part to science, we are on our way to recovery.

The scientific community, and particularly biotechnology, has made a very important contribution to tackling this huge healthcare challenge we are facing. This response has been possible thanks to an unprecedented mobilisation of resources and has come in different forms: clinical studies to understand the disease, diagnostic tests, medical treatments and the much-awaited vaccines.
These vaccines are the fruit of the community's hard work, joining forces and pooling knowledge and resources to chart a path out of the ongoing healthcare crisis.

The main players in this milestone have been universities, companies, research centres, hospitals and governments, who have pooled resources in a commitment to find solutions. At IQS we have also been part of this joint effort. We've done so by putting together a research programme focused on developing a Covid-19 vaccine candidate, which was possible thanks to the support of the Ministry of Science and Innovation through Carlos III Health Institute. Right now, our vaccine candidate is in the pre-clinical phases, but these are only the first steps in a complex, ambitious project we hope will yield promising results in the coming months.

At IQS, from the very start, we have worked to build bridges between scientific research and the business world through technology transfer. This, along with technical and humanistic teaching, has always been our vocation.

We know from experience that companies that carry out R&D projects in the biosciences work in a highly complex and competitive environment. Adapting to market needs, overcoming technical difficulties and high development costs, while also being able to bring attractive, profitable products to market means facing huge challenges. To help them overcome these challenges, at IQS we have a service that provides bioscience R&D solutions for the industry to facilitate transfer of their projects through to commercial exploitation.
With this goal in mind, we operate as an external R&D department, making the development challenges of our partners our own. Our solutions cover the whole value chain, acting as a one-stop-shop: from basic research and proof of concept, to bioprocesses, preindustrial production and quality control.

Finally, we would like to highlight that at IQS we are proud to be part of the Spanish biotechnology ecosystem, which in a very difficult year has proven itself resilient, innovative and capable of contributing valuable solutions for society. It is also a pleasure to have this opportunity to be part of the 2020 AseBio Report, which is so important for understanding and raising awareness of the sector.

We wish all our friends in the biotechnology world health, above all, but also success in their business and science endeavours!

IQS
PERSONA CIÈNCIA EMPRESA
UNIVERSITAT RAMON LLULL

Research agreements:

3P Biopharmaceuticals announced its collaboration with Invizius to develop an innovative treatment to reduce the cardiovascular complications associated with dialysis.

ADL Bionatur set up a partnership with **Biokit** after its technology was chosen to monitor key processes during the development and manufacturing of IVD tests and to increase the sensitivity of the testing.

AINIA announced that, with Manor Farm, it would begin research on incorporating antimicrobial substances, including bacteriophages, to reduce or limit the spread of microorganisms (increasing lifespan), as well as preventing salmonella on chicken packaging.

Almirall, the University of South Australia and the Research Institute of the Hospital de la Santa Creu i Sant Pau Foundation joined forces to identify new biomarkers and treatments for skin cancer and atopic dermatitis. The company also signed a collaboration agreement with the University of Dundee to do multi-target research to develop novel targeted protein degraders.

Aptus Biotech with the Autonomous University of Madrid and **Foundation for Biomedical Research of the Ramón y Cajal University Hospital** worked on preclinical development of an aptamer to treat cancer.

Atrys Health and the HM Hospitals Research Foundation forged an alliance to develop a dynamic platform for rapid detection of actionable molecular alterations in liquid and solid biopsies from oncology patients.

Bayer CropScience and the EPA announced a deal to create a new biological solution targeting three species: *Aonidiella aurantii, Planococcus citri* and *Delottococcus aberiae.*

Bioibérica and Nestlé Health Science worked together to innovate in joint health and mobility.

Merck & Co and Biontech Therapeutics joined forces for phase II assessment of BO-112 in combination with Keytruda to treat refractory advanced malignant melanoma.

Biosearch and By-Health established a collaboration agreement for R&D and a new contract to supply isolated strains from breast milk.

Canvax Biotech, the Andalusian Public Foundation Progress and Health and **the Foundation for Biomedical Research of Córdoba** announced a partnership for preclinical and regulatory development of modular multi-target CAR-T therapies based on the ImmunoDrone™ platform, to treat solid and haematology tumours.

Crazy Science & Business with the Centre for Molecular Biology Severo Ochoa in Madrid and the Hospital La Paz Institute for Health Research, began a clinical trial in humans on blood biomarkers in patients after acute myocardial infarction.

Doitplenoptic, IRB Barcelona and EMBL Rome carried out a pilot programme to validate Fourier lightfield microscopy in biological samples.

The Medina Foundation and **Atrys Health** worked together on a research project in prostate cancer, developing a molecular signature based on genomics and metabolomics, from liquid biopsies to predict response to radiotherapy and early relapse of prostate cancer.

Imereti partnered with Net Pharma, joining its community to develop, manufacture, monitor and deliver advanced therapy drugs.

Ingulados and **AINIA** announced their collaboration to develop micro-encapsulation of bacteriocins generated in the fermentation processes of animal feed.

Janssen, Kaertor, Lilly and AECC partnered to incubate R&D projects in oncology.

Reig Jofre and **Bionos Biotech** partnered with Bosch i Gimpera Foundation and **Foundation for Biomedical Research of the Ramón y Cajal University** to begin development of new nanotechnology therapies for follicular release applied to alopecia (ALOSTOP).

Limno Pharma and **Foundation Progress and Health** worked together on the Lead Retina project to assess the efficacy and safety of a drug to treat retinitis pigmentosa.

Myriad Genetics and US company Optra Health partnered on Gene ™, a new artificial intelligence data tool for patients with hereditary cancer.

Natac announced it was collaborating with the Pro-Enrich project to develop biorefineries that can process byproducts from citrus processing and manufacturing using biomass fractionation technology.

One Way Liver announced a partnership with Bioef and IDIVAL to develop new diagnostic and prognostic methods for non-alcoholic fatty liver disease (NAFLD) based on metabolomic algorithms in serum.

Oryzon Genomics and Columbia University began development of precision medicine therapies for schizophrenia.

Vaxdyn and the National Centre for Microbiology partnered to develop model animals for the preclinical package for the vaccine for antibiotic resistant pneumonias.

VIVEbiotech announced a collaboration with Xyphos Biosciences to provide support for clinical development of a convertible CAR-T ™ cell therapy, for which VIVEbiotech will develop and manufacture lentiviral vectors.

ZeClinics and VHIR Barcelona agreed to collaborate to find new cancer therapies.

Zymvol Biomodeling and Aminoverse began designing performance-enhancing enzymes for methods like random mutagenesis.

7.2 Attracting international companies

AseBio members boosted their international presence 19% in 2020.

35 AseBio members have a direct presence in 48 countries on all continents, six more than in 2019.

In terms of the number of subsidiaries of our members outside of Spain, there were 27 more than the previous year for a total of 163.

By country, the United States remains the country with the most subsidiaries.

Nineteen members have subsidiaries in the United States, followed by 10 established in both Italy and Portugal, and nine each in Brazil and France.

The geographic distribution is similar to that of previous years: Europe has the most subsidiaries, with 47% of the total, followed by Latin America with 26%, the United States and Canada with 13%, Asia and Oceania with 12% and Africa with 2%.

Regarding the United Kingdom, despite the effects of Brexit, our members have eight subsidiaries in the country, two more than the previous year.

47%	Europe	13%	USA/Canada	2%	Africa
26%	Latin America	12%	Asia/Oceania		

Country	Number of subsidiaries
USA	19
Italy	10
Portugal	10
Germany	9
Brazil	9
France	9
United Kingdom	8
Mexico	7
Belgium	6
Chile	6
Colombia	5
China	4
Peru	4
Poland	4
Argentina	3
Austria	3
India	3
Sweden	3
Switzerland	3
Australia	2
Canada	2
Denmark	2
Ecuador	2
United Arab Emirates	2
Japan	2
Malaysia	2
Morocco	2
Singapore	2
Saudi Arabia	1
Bolivia	1
Costa Rica	1
Cuba	1
El Salvador	1
Finland	1
Greece	1
Guatemala	1
Netherlands	1
Hungary	1
Indonesia	1
Israel	1
Kazakhstan	1
Monaco	1
Nicaragua	1
Norway	1
Czech Republic	1
Thailand	1
Turkey	1
Uruguay	1

Table 7.1 shows where our Spanish companies are present by country and the number of subsidiaries in each market, while table 7.2 is a list of AseBio members with the countries where they have a direct presence.

Table 7.1.
Breakdown of subsidiaries of AseBio member companies.
Source: AseBio.

BIOLAN EXPANDS INTERNATIONALISATION WITH NEW COVID-19 PRODUCTS

Internationalisation must be an intrinsic part of day-to-day operations and one of the pillars on which a company is based in order for the hard work involved to truly yield successful results and make the company more competitive.

BIOLAN, a Basque biotechnology company located in the Bizkaia Science and Technology Park and in the market since 2009, has always been very clear that it was set up with the global view of not putting up borders for its products. BIOLAN offers global solutions to address global needs and this is the basic premise behind its approach to new developments that lead to competitive products that penetrate diverse geographic markets.

Technological development and innovation have always been in the BIOLAN DNA, striving for this global response. BIOLAN is a company devoted to bringing to the food and health market proprietary, innovative, disruptive and, above all, competitive products based on biosensors to detect and measure molecules related to food quality and safety, as well as diagnosing pathologies and monitoring therapies. As such, there is no getting around the global reach of its solutions, which requires the company to focus all its efforts and resources there.
The current Covid-19 pandemic is the best example of a global issue, extremely important with serious global consequences, as we unfortunately have seen over the past year and a half.

In the beginning, containment efforts focused on solutions from very specific, specialised markets, which had an advantageous position at the most critical point of the global healthcare crisis and clearly benefited from it. But other local and regional initiatives, fully exportable to the planet as a whole, have progressively appeared and they must find a place on the international scene.

BIOLAN, like many other biotech companies, identified this opportunity to put all its expertise and experience to work in order to contribute effective, competitive solutions to the pandemic through its BIOLAN HEALTH line of business. In just a few months, the company put a considerable portion of its human resources and facilities to work on getting a SARS-CoV-2 rapid antibody test to market. Then came an antigen test to diagnose the presence of the virus, and the company's portfolio of products in this field is currently expanding to include a proprietary ELISA test.
Based on this strategic, top-priority premise of providing local, 'km0' solutions to alleviate dependence on international firms, the challenge BIOLAN is once again facing is to bring its solutions to the international market, making them competitive enough to overcome the barrier of borders.

In this global journey of BIOLAN Covid-19 products, the company's international sales force is crucial. This Basque firm is currently present in over 55 countries with 7 sales offices in Southeast Asia, Central and South America, northern Africa and Europe, and an export rate of 82%.

In these tumultuous times, when mobility is limited, having our own team in these destinations is more important than ever to overcome the legal and regulatory barriers that are part of importing healthcare products and complicate the process. The products are already registered in markets like Chile and Ecuador, and the process is very advanced in Thailand and Morocco, among other countries, promising very interesting, successful penetration in those markets.

BIOLAN
HEALTH

Ackermann International	Peru, Brazil, Chile, Uruguay, Colombia, Mexico, Cuba, USA, Canada, United Kingdom, France, Germany, Italy, Czech Republic, Hungary, United Arab Emirates, India, Malaysia, Israel
Agarose Beads Technologies	USA
Agrocode	Brazil, China, USA, Peru
AlgaEnergy	USA, India, Italy, Japan, Mexico, Turkey, Australia, France, Brazil
Almirall	Germany, Austria, Belgium, Denmark, USA, Netherlands, Italy, Poland, Portugal, United Kingdom, Switzerland, France
AMS Lab	Italy, Morocco, Portugal
Antares Consulting	Belgium, Bolivia, Chile, France, Portugal
Asphalion	Germany, United Kingdom
Atrys Health	Colombia, Chile, Brazil
BBI bcn	United Kingdom
Biobide	USA
Bioibérica	Germany, Brazil, USA, Italy, Poland
Biolan	Chile, Ecuador, Indonesia, Mexico, Peru, Morocco
BTI Biotecnology Institute	Germany, USA, Italy, Mexico, Portugal, United Kingdom
Elzaburu	China
Ferrer	Germany, Argentina, Belgium, Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, USA, France, Guatemala, Greece, Italy, Kazakhstan, Mexico, Nicaragua, Peru, Portugal
Genómica	Brazil, China, Sweden
Grifols	Germany, Saudi Arabia, Argentina, Australia, Austria, Brazil, Canada, Chile, China, Colombia, Denmark, USA, United Arab Emirates, Finland, France, India, Italy. Japan. Malaysia, Mexico, Norway, Poland, Portugal, United Kingdom, Singapore, Sweden, Switzerland, Thailand
Laminar Pharma	USA
Leti	Portugal, Germany
Life Length	USA
mAbxience	Argentina, Switzerland
Minoryx Therapeutics	Belgium
Natac Biotech	USA
Neurofix	USA
NimGenetics	Brazil, Mexico, Portugal
NorayBio	France, Italy
Oncoheroes	USA
Oryzon	USA
PharmaMar	Germany, Austria, Belgium, USA, France, Italy
Proteos Biotech	Colombia
Reig Jofre	Belgium, USA, France, Portugal, United Kingdom, Singapore, Poland, Monaco, Sweden
Sanifit	USA
Sermes CRO	United Kingdom
Vitro	Portugal

Table 7.2.
AseBio members and countries where they have a direct presence. Source: AseBio.

PAMPLONA TO HOST TENTH EDITION OF SPAIN'S TOP BIOTECHNOLOGY EVENT: BIOSPAIN

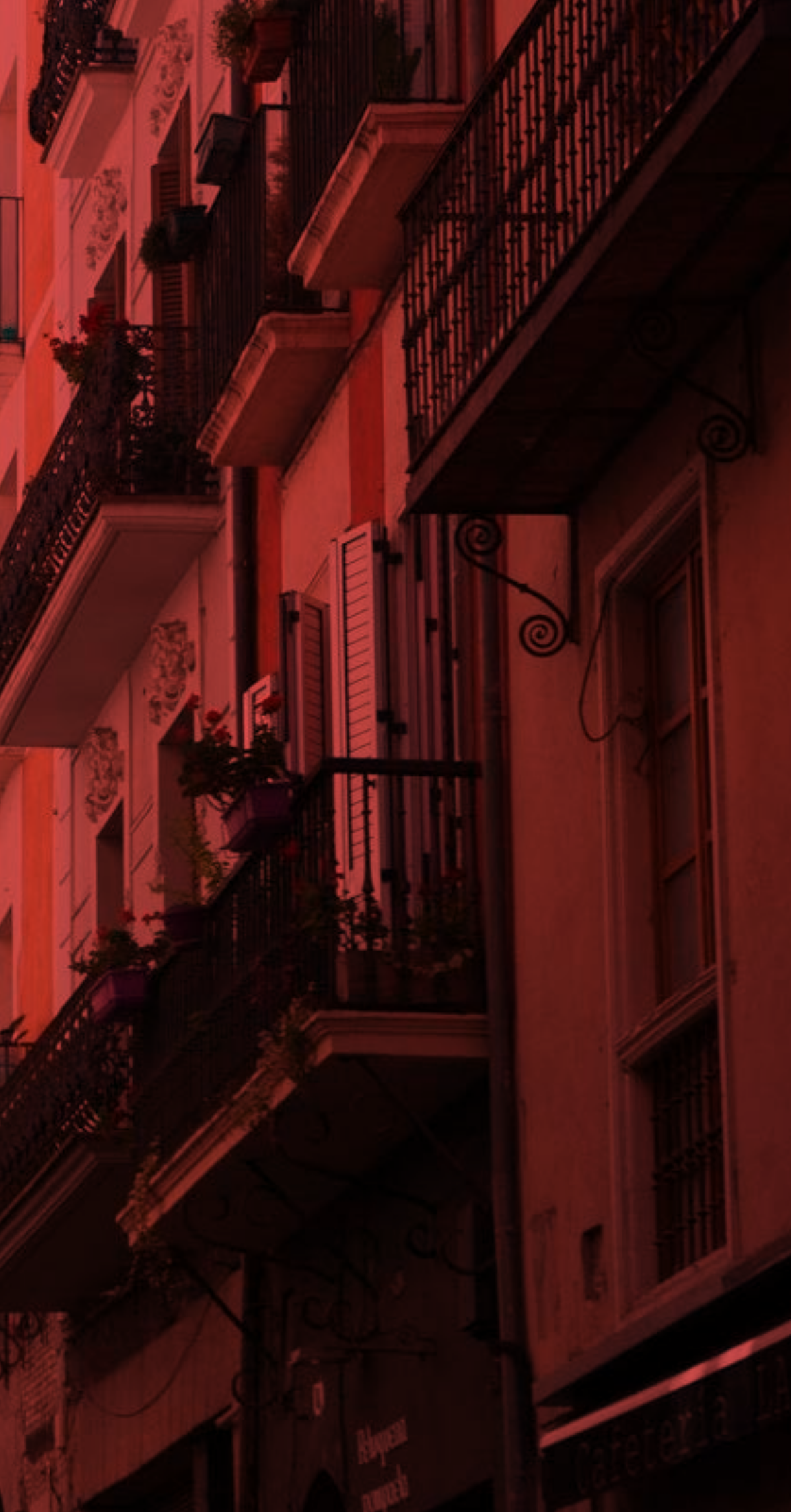
BIOSPAIN is the main biotechnology event in Spain and one of the most important in Europe, hosted by the Spanish Bioindustry Association (AseBio) in collaboration with Sodena, the Government of Navarra's financial instrument, in this tenth edition.

BIOSPAIN is the tool AseBio uses to create business and investment opportunities, thanks to over 17,000 one-to-one meetings held over the past 10 years. As such, AseBio has been an integral part of developing the Spanish biotechnology ecosystem.

The 10th edition of BIOSPAIN will be a hybrid event held 27 September through 1 October 2021 at the Baluarte Congress Centre and Auditorium of Navarra in Pamplona-Iruña. The event will feature a full programme of conferences covering the main, most relevant topics, such as immunotherapy, CAR-T, precision medicine, CNS, the circular economy, agrobiotechnology and artificial intelligence.

The companies that attend BIOSPAIN, mainly Spanish biotechnology SMEs, not only get lots of new business leads, but also a platform for international exposure where they can share their capacities in biotechnology first hand. So much so that the survey of participants in the 2018 edition showed that 84.81% reported identifying real business opportunities.

BIOSPAIN
Trade show and partnering
September 29th – October 1st 2021
Pamplona, Spain



IMPACT

08

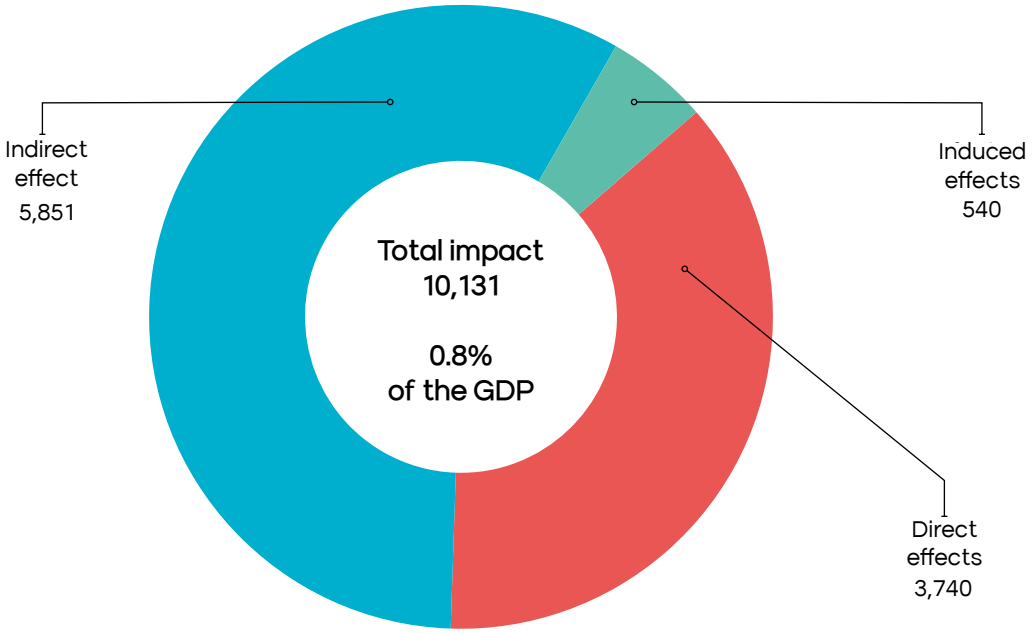
IMPACT

8.1 Economic impact

Impact on GDP:

The contribution of biotech to the GDP rose slightly to 0.8%.

The joint total of direct, indirect and induced effects of the activity of biotech firms throughout the production chain gave us their joint impact on the total gross domestic product (GDP).
In 2019, the activities of biotech firms generated more than €10.1 billion in income, roughly 0.8% of the national total, mainly through indirect effects caused by flows of intermediary goods and services (graph 8.1).



Graph 8.1. Impact of biotech companies on the GDP (€ millions of 2019 GDP) Source: Compiled from the information on companies collected by AseBio.

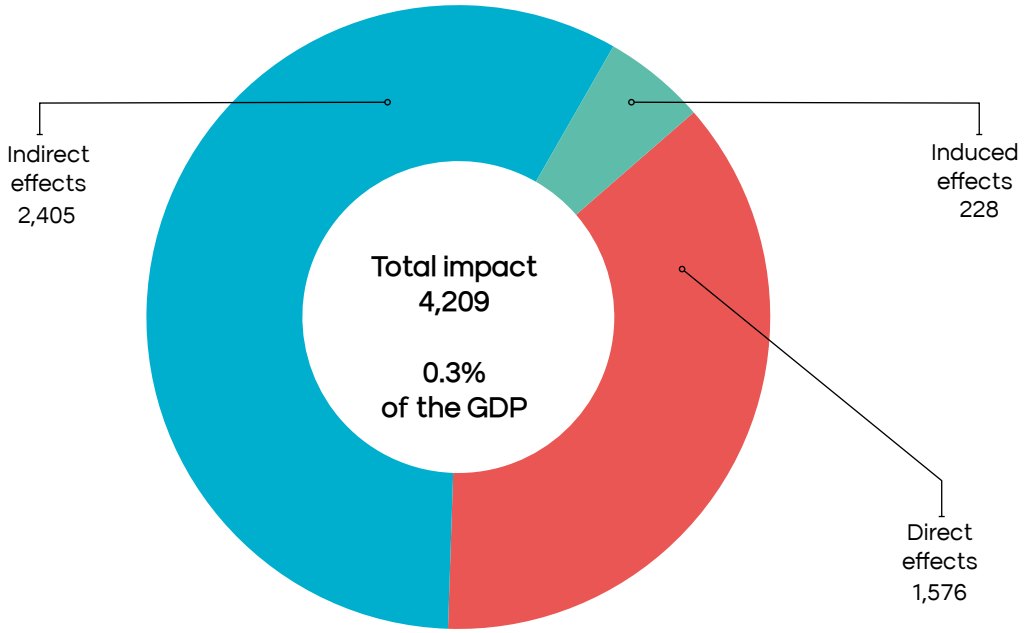
Impact on tax revenue.

Biotech firms contribute 0.3% of the GDP in State taxes.

In 2019, the total impact on tax revenue of biotechnology companies was €4.2 billion. This estimate is based on the various income flows generated by the activity of biotechnology companies and the average tax rate for each type of income.

This accounts for roughly 0.3% of the GDP (graph 8.2).

Of this total tax revenue, one third is from social security contributions, another third from indirect taxes (VAT and other taxes) and the rest from direct taxes on personal income (IRPF) and business income (corporate tax).



Graph 8.2.
Impact of total tax revenue from biotech companies (€ millions of 2019 tax revenue). Source: Compiled from the information on companies collected by AseBio.

Total production of biotech firms.

The joint turnover for biotech companies was 1% of the GDP in 2019.

In 2019, biotech firms saw a significant rise in turnover, up 20.8% to nearly €12 billion and making up over 1% of the GDP for the first time ever.

To generate this turnover, the companies had to acquire intermediary goods valued at more than €8.1 billion, which generated over €3.7 billion in income.
This income is distributed nearly equally between employee compensation and gross operating surplus and net taxes. Plus, total employment in these biotech firms rose around 9% to over 29,500 jobs, making up 0.15% of total employment (table 8.1).

		2019	2018	2017
Production	€ million	11,914	9,861	9,315
	% gwth.	20.8%	5.9%	6.0%
	% GDP	1.0%	0.8%	0.8%
Intermediate goods	€ million	8,174	7,230	6,433
Gross value added		3,740	2,631	2,882
Employee salaries		1,878	1,759	1,515
Sur. Gross margin profit and Net taxes		1,862	872	1,368
Employment	Number of people	29,512	27,085	25,029
	% gwth.	9.0%	8.2%	10.6%
	Total %	0.15%	0.14%	0.13%

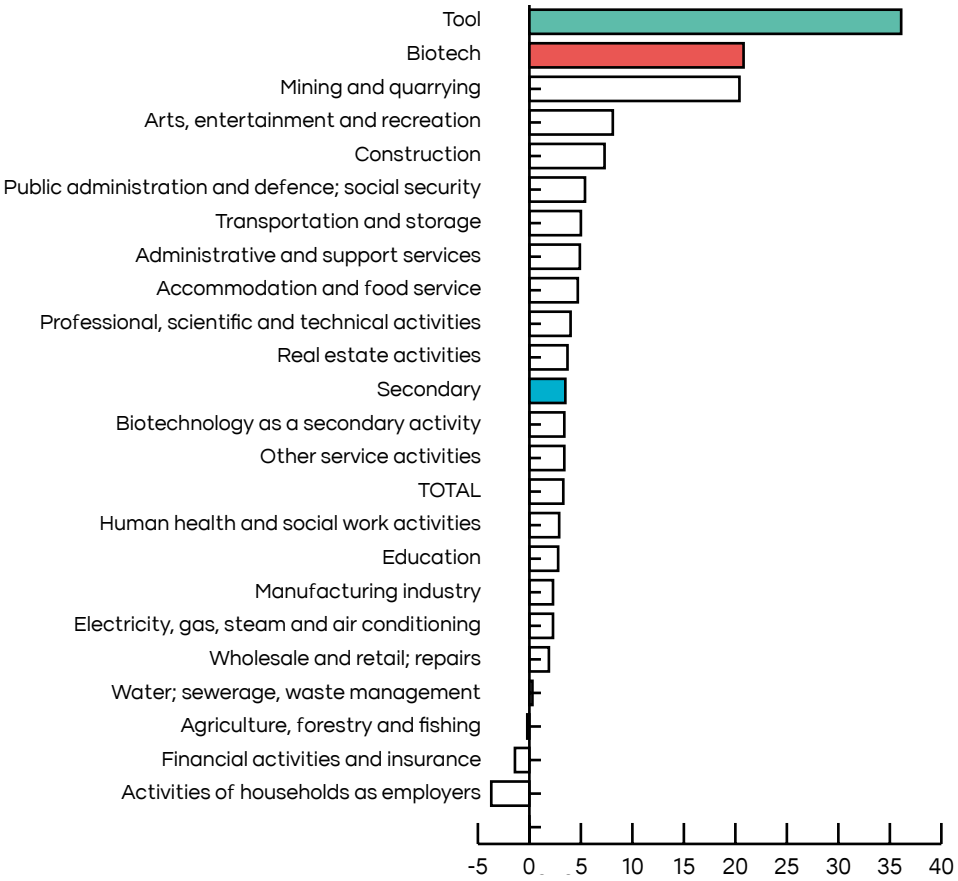
2016	2015	2014	2013	2012	2011
8,787	8,777	7,664	6,368	7,045	7,038
0.1%	14.5%	20.4%	-9.6%	0.1%	12.5%
0.8%	0.8%	0.7%	0.6%	0.7%	0.7%
6,592	6,907	5,952	5,040	5,523	5,455
2.195	1,870	1,712	1,328	1,522	1,582
1,330	1,244	1.096	875	947	976
866	626	616	453	575	606
22,637	21,504	19,120	15,129	16,470	16,723
5.3%	12.5%	26.4%	-8.1%	-1.5%	10.2%
0.12%	0.12%	0.11%	0.09%	0.09%	0.09%

Table 8.1. Estimated economic activity of biotech firms. Source: Compiled internally from the information on companies collected by AseBio.

Biotechnology leads production growth.

Companies that use biotechnology as a production tool and biotech firms lead the ranking for production growth, meaning increased turnover, compared to all economic activities (graph 8.3).

Most other activities trail far behind, except mining, and biotechnology is well above average growth, at 3.3%, for all activities.



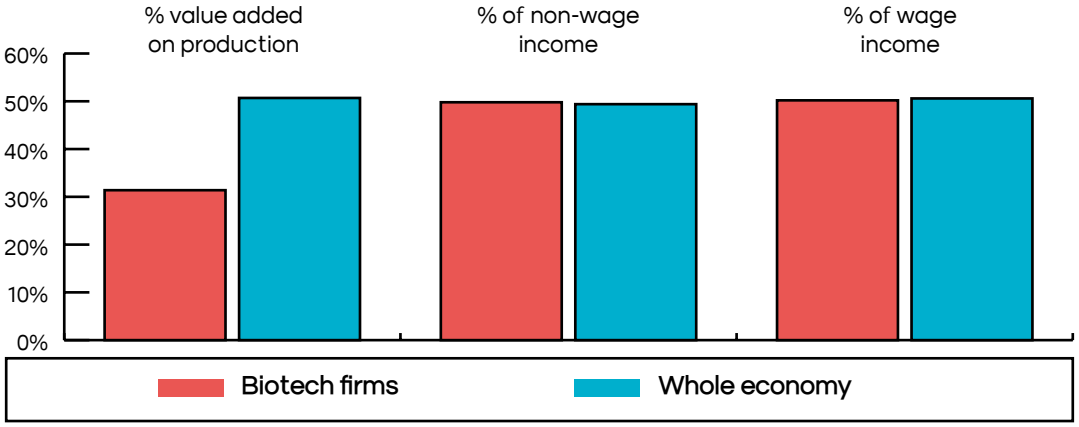
Graph 8.3. Comparative growth dynamics of biotechnology activities and other economic activities. Source: Compiled from a sample of companies collected by AseBio and the Survey on Biotechnology Use. INE.

Productivity and salaries.

Productivity and salary per employee at biotech firms is more than double the national average.

As we noted in the chapter on talent and diversity (graph 3.4), average productivity per employee is more than double the Spanish national average.

However, the greater need to acquire intermediary goods and services for production means the income generated (% value added) compared to production is considerably lower than the Spanish average at these biotechnology companies (graph 8.4).



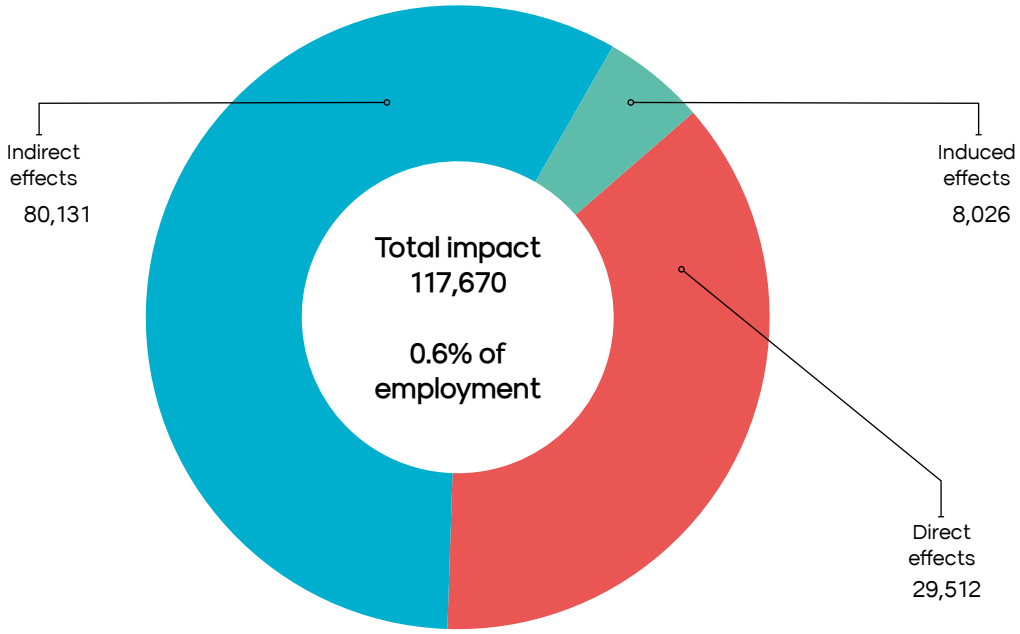
Graph 8.4. Basic productivity ratios for biotech firms and the whole economy. Source: Compiled internally from the information on companies collected by AseBio.

8.2 Impact on employment

Spanish biotech companies create 117,700 jobs, 0.6% of total employment nationwide.

The impact on employment of activities carried out by biotech firms is amplified throughout the production chain.

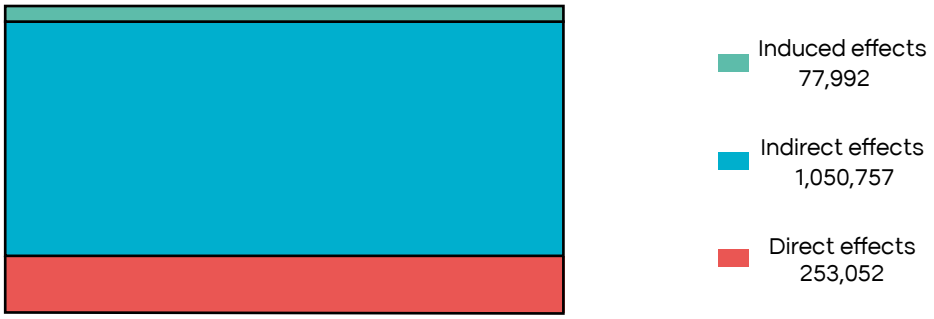
So, for each direct job created, almost three indirect or induced jobs are also generated. This means these companies are responsible for maintaining more than 117,000 jobs and make up 0.6% of the national total (graph 8.5).

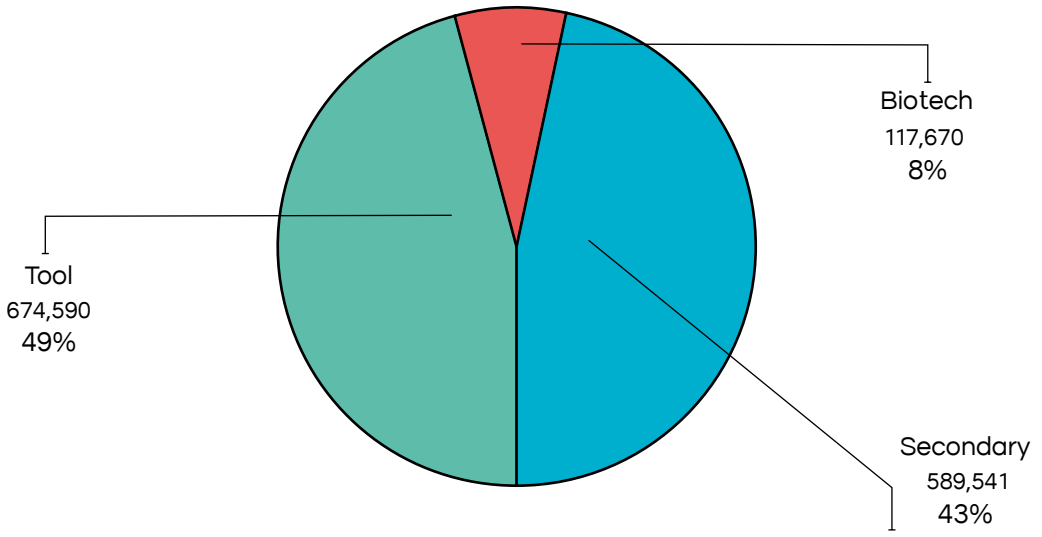


Graph 8.5.
Impact on total employment of biotech firms (Total jobs in 2019).
Source: Compiled internally from the information on companies collected by AseBio and the Survey on Biotechnology Use. INE.

If we broaden our analysis of the impact on the labour market as a whole to include all companies doing biotechnology activities, the total employment that directly or indirectly depends on the activities carried out by these companies is more than 1,380,000 jobs, or 7.5% of the national total (graph 8.6).

Of these, 76% are direct effects from the consumption of intermediary goods and services and investments made by biotechnology companies. By type of company, biotech firms account for 8% of this impact, while those with biotechnology as a secondary activity contribute 43% and those that use biotechnology as a production tool, the remaining 49%.

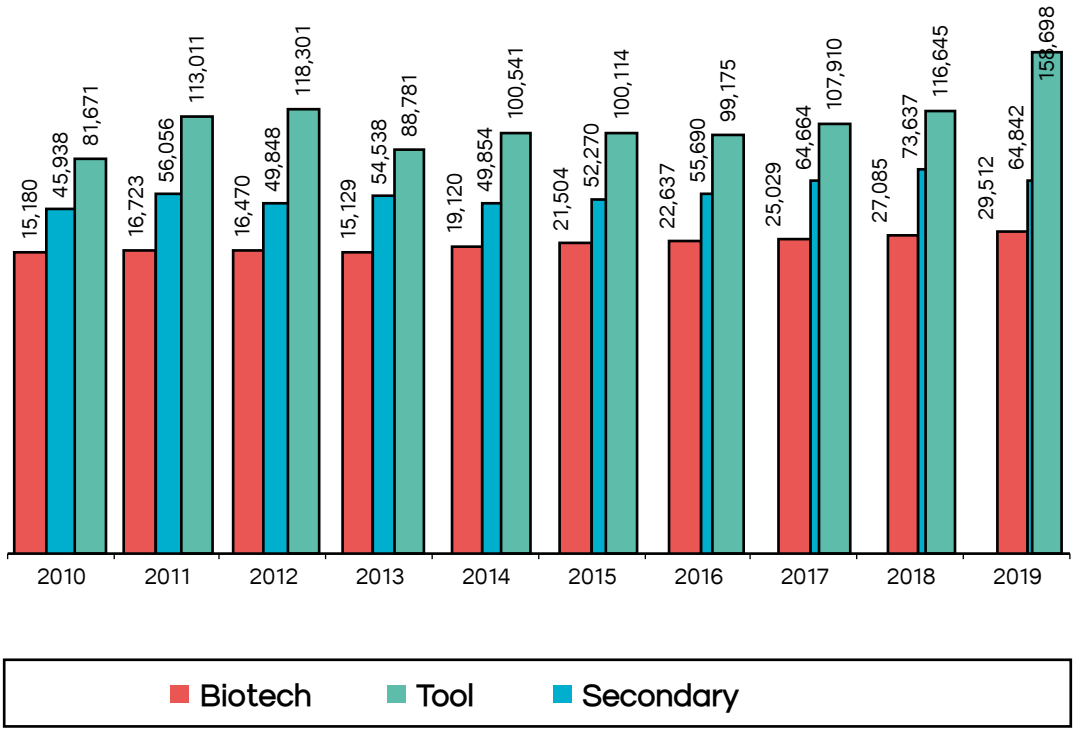




Graph 8.6.
Total contribution to employment by companies with biotechnology activity
Source: Compiled from a sample of companies collected by AseBio and the Survey on Biotechnology Use. INE.

Joint employment at companies doing biotechnology activity has been growing steadily since 2014, and the pace has increased significantly over the past three years. In 2019, the total volume of employment at biotechnology companies was more than 253,000 employees, up 16.4% (graph 8.7).

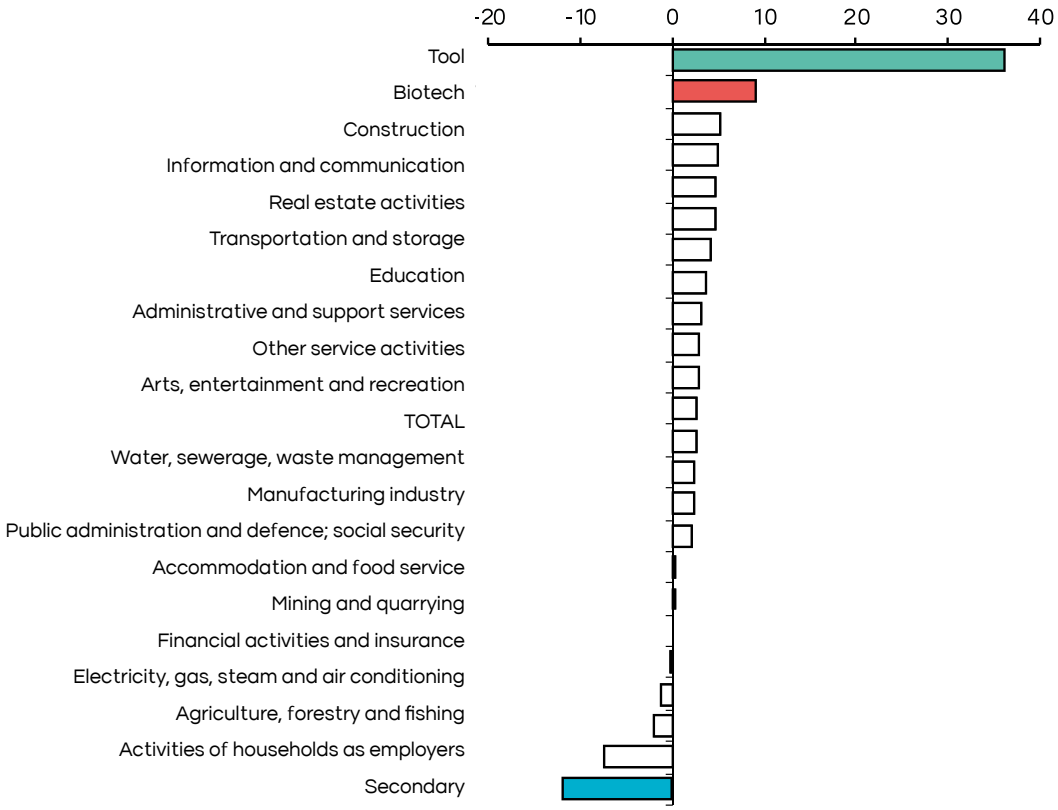
Of these 253,000 employees, 12% are employed by biotech firms, 34% by companies with biotechnology as a secondary activity and the remaining 54% by those that use biotechnology as a production tool.



Graph 8.7.
Evolution of employment in biotechnology companies.
Source: Compiled from a sample of companies collected by AseBio and the Survey on Biotechnology Use. INE.

As graph 8.8 shows, the biotechnology sector as a whole leads the ranking of production activities with the highest growth in employment, above sectors like construction or information and communications.

If we look more closely at the growth rate for each one, we see that employment rose 36.1% at companies that use biotechnology as a production tool, grew 9% at biotech firms and dropped 11.9% at companies with biotechnology as a secondary activity.



Graph 8.8. Comparative employment growth dynamics of companies with biotechnology activity (Employment growth rates for 2019). Source: Compiled from a sample of companies collected by AseBio and the Survey on Biotechnology Use. INE.

SUSTAINABILITY AT THE CORE OF OUR STRATEGY

Guided by our purpose to do 'Science for a better life', in 2020 we announced our commitment to advancing and accelerating our actions from Iberia to tackle some of the greatest challenges in the world, clearly focused on sustainability.

Although 2020 was a devastating year in many regards, impacting the health of millions and the economic development and social equity expectations everywhere, it was also the year when sustainability and the challenges of climate change and population growth came centre stage.

We support the United Nations Sustainable Development Goals (SDG) more than ever and we urgently need actions that will have a positive effect in as many areas as possible.
So, at Bayer we have advanced in the awareness that our contribution is crucial to achieving the goal of 'health for all, hunger for none'.

Agriculture plays an important role in the future of our planet and must grow enough to feed nearly 10 billion people by 2050 while using less natural resources.
At Bayer, we are committed to finding new solutions and the best answer, with farmers, researchers and partners.

Never before has innovation in agriculture been so important, as it is key in tackling the challenges the global food system is facing: Growing enough for our world while conserving water, land and energy, which requires new tools and technology.

At Bayer, we are committed to providing better solutions for all farmers, to help them, consumers and our planet prosper, which is why we invest in research and development in plant breeding.

Plant breeding gives farmers crops that adapt better to their environment and consumer preferences using the natural genetic diversity in each crop family. Some plants adapt better to certain climates and are more resistant to changing environmental conditions, giving them a better chance at survival, which means more productive crops. Plants can also be bred for better quality and a better fit with consumer tastes, which reduces food waste.

In line with the global Sustainable Development Goals (SDG) laid out by the United Nations, we've set ambitious goals of our own and want to work effectively towards achieving them progressively.

BAYER

8.3 Biotechnology and the 2030 Agenda

Working in biotechnology means working to improve the lives of millions of people

AseBio and the 2030 Agenda.

September 2019 was the fourth anniversary of Spain and 192 other countries signing the Sustainable Development Goals (SGDs) on the 2030 Agenda. In 2021, at the Spanish Bioindustry Association (AseBio), we are still working to show how biotechnology will help us achieve these goals.

The United Nations estimates the global population will reach nearly 10 billion by 2050, so we will have to have better tools and policies to achieve the SDG, and biotechnology will undoubtedly be key among them.

Solutions for curing diseases, responding better to health crises, food safety, reducing greenhouse gas emissions and ending hunger will come from the biotechnology sector.

Our sector's innovativeness has given biotechnology a key role in improving quality of life for millions. Now, the 2030 Agenda has set new global challenges for the biotechnology sector, with a universal, comprehensive and transformative vision.

SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Thanks to biotechnology, we can help end hunger by making crops more efficient and nutritional using techniques like genetic engineering.

Plus, by adding probiotics and prebiotics to foods, biotechnology helps make them even healthier. Furthermore, biotechnology techniques can be used to detect toxins and contamination in food, helping ensure food safety.

Food safety	ADM Biopolis, AINIA, Best Medical Diet, Biobide, Biolan, Bionos, PCTAD Foundation, Ingenasa, Leitat, Operon, Promega Biotech, Protoqsar, Sistemas Genómicos.
Improving crops	Agrocode, Alcaliber, Bayer, Bioibérica, Biorizon Biotech, BDI Biotech, Eurogenetics, PCTAD Foundation, Genmic, Neiker, Pevesa, Plant Response, Sigma-Aldrich, Valgenetics.
Improving nutrition	ADM Biopolis, AlgaEnergy, Bayer, BDI Biotech, Best Medical Diet, Bioibérica, Biosearch Life, Dr Healthcare, DSM Nutritional, Imdea Alimentación, Natac Group, SOlutex.
Improving animal health	ADL Solutions, AlgaEnergy, Aquilon, Artinvet, Ascil Biopharm, Bioibérica, Biosearch, Diomune, Histocell, Ingenasa, Ingulados, Leitat, MSD, Microomics, Neiker, VLPbio.

SDG 3. Ensure healthy lives and promote wellbeing for all at all ages.

Some 350 million people benefit from biotechnology therapies and 69% of all drugs being developed in the world use biotechnology. Nearly half of all biotech firms focus on human health.

The biotech sector continues to fight diseases like Alzheimer and cancer, producing biodrugs, detecting and diagnosing illnesses more quickly and precisely, producing vaccines and using other biotechnology tools to prevent diseases and contain infectious diseases.

Developing innovative drugs for diseases like:

Cancer	Abbvie, Ability Pharma, Allinky, Almirall, Amadix, Amgen, Aptus Biotech, Archivel Farma, Ascil Biopharm, AstraZeneca, Atrys Health, Biomedica, Bristol-Myers, Canvax, CITRE, Ciber, CRG, ISCIII, CNIO, CRG, Entrechem, Medina Foundation, GEICAM, Genetracer, Gilead, GSK, Highlight Therapeutics, Ibima, Ikan Biotech, Incyte, IIS Fundación Jiménez Díaz, i+ 12 de Octubre, iiS La Fe, iiS Ramón y Cajal, IRB Barcelona, Janssen, Laminar Pharma, Lemtisem Biotech, Leukos Biotech, Merck, Miltenyi Biotec, MSD, Myriad Genetics, Nanoimmunotech, Nanoligent, Novartis, OncoHeroes, Onena Medicine, Ona Therapeutics, OneChain Immunotherapeutics OWL Metabolomics, Oryzon, Palobiofarma, Peptomyc, Pharmamar, Promega, qGenomics, Roche, SOM Biotech, VCN Biosciences, Vivia Biotech, Vivotecnia, ZeClinics.

Rare diseases	Alexion, Arthex Biotech, Biomarin, Bionos, CarthaGenetics, Ciber Fundación Medina, Ibima, i+ 12 de Octubre, ISCIII, Minoryx, Sobi, SOM Biotech.
Central nervous system	Abbvie, Accure Therapeutics, Allinky, Amgen, AptaTargerts, Araclon Biotech, Ascil Biopharm, AstraZeneca, Atrys, Biocross, Biomarin, Bionos, Bristol-Myers, Canvax, DobeCure, Emerald Biotechnology España, Ferrer, MEDINA Foundation, Gate2Brain, Grifols, Grupo Cellus, Ibima, iiS Fundación Jiménez Díaz, i+ 12 de Octubre, iiS La Fe, iiS Ramón y Cajal, IRB Barcelona, Janssen, Laboratorios Rubió, Laminar Pharma, Merck, Miltenyi Biotec, Minoryx, MSD, Neural Therapies, Neurofix Pharma, Novartis, Oryzon, Palobiofarma, Roche, SOM Biotech, Sylentis, Vivia Biotech, ZeClinics.
Dermatology	Abbvie, Almirall, Bionos, Canvax, Derma Innovate, Histocell, Incyte, Inhibitec, Laboratorios Leti, Novartis, Peaches Biotech, Reig Jofre.
Respiratory	Almirall, Amgen, Ciber, Ferrer, Gilead, GSK, Histocell, I, Merck, MSD, Novartis, Palobiofarma, Reig Jofre, Roche, Vivotecnia, Zendal.
Cardiovascular diseases	Almirall, Amgen, Aptatargets, AstraZeneca, Bristol-Myers, Ciber, Corify Care, Diomune, Gilead, GSK, Ibima, iiS Fundación Jiménez Díaz , i+ 12 de Octubre, iiS La Fe, iiS Ramón y Cajal, IQS, Janssen, Laboratorios Rubió, Laminar Pharma, Life Length, Miltenyi Biotec, MSD, Natac Group, Novartis, Sanifit, Roche, Sobi, ZeClinics.
Immunological diseases	Abbvie, Almirall, AptaTargerts, AstraZeneca, Biohope, Bristol-Myers, GSK, Diomune, Dr Healthcare, Emerald Biotechnology España, Entechem, Grifols, Ibima, i+ 12 de Octubre, iiS Ramón y Cajal, iiS La Fe iiS Fundación Jiménez Díaz, Incyte, Janssen, Laboratorios Leti, Laminar Pharma, Miltenyi Biotec, Natac Group, Novartis, Palobiofarma, Progenika, Remab Therapeutics, Roche, Sobi.
Infectious disease	Abbvie, ADL, Algenex, Aptus Biotech, Archivel Pharma, Ascil Biopharm, AstraZeneca, Bionos, Bristol-Myers, Ciber, Diomune, MEDINA Foundation, Gilead, Grifols, GSK, iiS Fundación Jiménez Díaz, i+ 12 de Octubre, iiS La Fe, ISCIII, Janssen, Laboratorios Leti, MSD, Microomics, Promega, Reig Jofre, Roche, SOM Biotech, Vaxdyn, Zendal.
Musculoskeletal disorders	Almirall, Allinky, Amgen, Bioibérica, BTI, DobeCure, Grupo Cellus, Histocell, Imereti, Incyte, Inhibitec, Laboratorios Rubió, Peaches Biotech, Reig Jofre, Sanifit.
Diseases of the digestive system	ADM Biopolis, Almirall, Amgen, Ciber, iiS La Fe, OWL Metabolomics, Palobiofarma, Takeda, ZeClinics.
Diseases of the genitourinary system and kidneys	iiS Fundación Jiménez Díaz, Laboratorios Rubió, Minoryx.

Vaccine development	Algenex, Archivel Farma, Ferrer, GSK, Merck, MSD, Vaxdyn, Zendal.

Developing products to diagnose diseases:

Developing products to diagnose diseases:	ADL Bionatur, ADM Biopolis, Admit Therapeutics, ADNtro, Algenex, Amadix, Aptus Biotech, Araclon Biotech, Atrys, Biocross, Biohope, Biokit, Biolan, Biomédica, bioSEQs Genomics, Biosfer Teslab, Biotools, BTI, Crazy Science, Diomune, Doitplenoptic, Droplite, Entechem, Ferrer, Genómica, Grifols, Igen Biotech, iiS La Fe, iiS Fundación Jiménez Díaz, Illumina, Immunostep, Ingenasa, Integromics, IUL, Labgenetics, Laboratorios Rubió, Leukos Biotech, Life Length, Microomics, Myriad, Nanoimmunotech, NimGenetics, Operon, OWL Genomics, Progenika Biopharma, Promega, Progenie Molecular, Secugen, Sistemas Genómicos, Venter Pharma, Vitro, Vivia Biotech, Whole Genix, ZeClinics.

SDG 5. Achieve gender equality and empower all women and girls.

The biotechnology sector has had the highest number of women working in R&D for over a decade. Biotechnology has great researchers, executives and entrepreneurs.

At companies in the biotechnology sector, nearly 60% of R&D staff are women (Spanish average: 30.7%).

SDG 6. Ensure availability and sustainable management of water and sanitation for all.

Biotechnology helps promote more sustainable water use with production processes and crops that help reduce demand for water.
It also ensures water is available and clean by purifying wastewater and identifying contaminants.

Through biotechnology techniques, microorganisms, microalgae and cyanobacteria are used to purify and eliminate chemical contaminants from water. They can also detect contaminants.

Water treatment and management	AINIA, AlgaEnergy, Bayer, Biobide, Drops&Bubbles Tecnología, Eurosemillas, Leitat.

SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all.

Biotechnology offers up alternatives to produce clean energy and ensure more efficient power use, as well as reusing urban and forestry waste and byproducts from certain industries, reducing their impact on the environment.

Alternative sources of biomass, from forestry and agriculture, are used more and more to produce clean, renewable energy.

Biofuel	ADM Biopolis, AINIA. AlgaEnergy, Spanish Bank of Algae, Leitat, CENER, Neiker, CICYTEX, PCTAD Foundation and CLAMBER.

SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

The biotechnology sector is highly innovative and each of the activities by biotechnology companies involves innovation.

Plus, as we've seen in previous sections, the number of companies increases every year and the sector helps generate quality employment.

The biotech sector invests more in R&D relative to production than nearly any other.

SDG 12. Ensure sustainable consumption and production patterns.

Biotechnology applications promote responsible consumption and production. Biological products are reused, recycled, turned into energy or can be composted, contributing to the circular economy.

AseBio is part of two European projects under Horizon 2020 that aim to promote more responsible consumption by improving society's access to bioproducts. They are Biobridges and Biovoices.

Waste valorisation	AINIA, BDI biotech, CLAMBER, CENER, CICYTEX, Cultiply, Leitat, Natac Group, Tebrio.

SDG 13. Take urgent action to combat climate change and its impacts.

Biotechnology helps mitigate the effects of climate change by replacing materials based on fossil fuels with biological ones, such as bioplastics or biopesticides, with the resulting reduction in CO_2 emissions.

Cutting CO_2	AlgaEnergy, Agrocode, Biorizon Biotech and CICYTEX.

Improving air quality	ISCIII, Ramón y Cajal Institute.

SDG 14. Conserve and sustainably use the oceans, sea and marine resources for sustainable development.

Biotechnology helps preserve marine ecosystems using techniques to monitor marine habitats and cleaning contaminated water using microorganisms, microalgae and cyanobacteria.

Growing algae	AlgaEnergy, Biorizon Biotech, Spanish Bank of Algae.
Microbiological treatment	ADM Biopolis, Leitat.
Fish health and production	Biomar, Tebrio.

SDG 15. Sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.

Biotechnology products are helping preserve life on earth and slow the loss of biodiversity.

In fact, according to data from the ISAAA, 231 million hectares of land have been saved in recent decades thanks to biotechnology crops and the environmental impact quotient has dropped 18.4%.

Reducing soil erosion	Bayer, Bioibérica, Neiker.
Reducing the need for arable land	AlgaEnergy, Biorizon Biotech, Pevesa.

SDG 17. Strengthen the means of implementation and revitalise the global partnership for sustainable development.

The Sustainable Development Goals require complex solutions, which makes it essential to forge alliances with other stakeholders in the system. Public-private partnership and international aspirations have allowed biotechnology to have a huge social, environmental and economic impact for decades now.

In 2020, our companies established 246 partnerships for R&D, clinical development, field trials or product distribution. Plus, this year most of those partnerships were to join forces to tackle the Covid-19 pandemic.

Nearly half of those partnerships were with an entity from the public sector, a foundation or technology centre, 88 with another biotechnology company and 54 with a company that uses biotechnology.

Even the association for the biotechnology sector in Spain, AseBio, is an organisation that represents the partnership of companies and the public sector to promote the biotechnology sector, valorising the excellent science produced at academic institutions and companies in the country. This spirit of public-private partnership and ecosystem-building vision is in the DNA of AseBio and the sector as a whole.

WE WORK FOR THE FARMING, FORESTRY AND ENVIRONMENTAL SECTOR

Boosting competitiveness, efficiency and sustainability in the agriculture and forestry sector, preserving our environment, conserving our local varieties, species and breeds, and ensuring food safety and quality are part of the NEIKER raison d'etre.

Integrating the United Nations Sustainable Development Goals (SDG) into the generation of scientific knowledge and the solutions we contribute to the sector is a key element in boosting the positive impact our actions have on society.

So, our researchers seek solutions that help increase food safety and nutrition (SDG 3) using sustainable agriculture (SDG 12).
To do so, our projects apply the One Health concept: an interdisciplinary approach to human, animal and environmental care.
We are promoting research to make sure food is not only safe and of good quality, but also healthier.

Aware of the importance of water (SDG 6), we strive to help agriculture make more responsible use of this resource, analysing availability and crop needs, and coming up with new varieties that can better adapt to the consequences of climate change.

We are also working to preserve biodiversity (SDG 15), in the animal, plant and microbial realms, by identifying and improving production systems that contribute to biological diversity and attempting to "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".

To promote these advances, we use biotechnology as a key tool for genetic improvement, diagnosis and monitoring, vaccine development, marker-assisted selection, omic technology, etc.

Specific examples of NEIKER activities aligned with the SDG include our research to obtain power from organic waste; optimising and managing land irrigation and fertilisation; minimising use of consumables; and identifying genes in different crops that promote drought or disease resistance to obtain new varieties that will better adapt to future climate conditions.

In recent months, we've delved deeper into our lines of work to foster the circular bioeconomy in forestry (with projects that promote the transition towards an economy based on biological resources), sustainability (implementing innovative practices on farms) and mitigation of the climate emergency (by taking part in the Basque Climate Change Strategy 2050.

These actions aspire to cover all our current needs without jeopardising the future of generations to come.

NEIKER

MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

It isn't time to collaborate; it's time to commit

The Sustainable Development Goals (SDG), since 2015, aren't just objectives but the path that will allow our society to progress, to have a future.

Failure to meet these goals goes much further than not hitting targets or reaching political deals. Not meeting them seriously endangers the future of our current society.

It is no longer enough to merely collaborate, support or foster; it is time to commit to achieving them. And biotechnology is one of the pillars of that commitment. The driving force behind the changes we need and the advances, discoveries and solutions that will make it possible.

This focus, necessarily radical, permeates the strategy, tactics and operations of a company like ours, Biorizon Biotech.

Technology and new paths through which we will achieve greater food safety, such as our biopesticide lines developed by characterising 2,000 strains of microalgae, identifying a wide variety of secondary metabolisms that include compounds with fungicidal capabilities that provide new solutions to pests, as promising substitutes for the current chemical solutions.

Our commitment to the SDG also shows in our research into biostimulants, allies to address the need to boost agricultural productivity sustainably.

Our Agora Sabana plant is the largest microalgae farming plant in Europe for agriculture and allows us to harvest species with precise, controlled characteristics at the volume needed to be commercially viable.

These solutions are a clear example that European companies are on the cutting-edge in these fields.

Another very important focus we can't forget is creating processes that bring us closer to a world with the circular economy at its core.

Biorizon Biotech is highly committed to research in purine and wastewater purification. Through various processes, this yields purified water for agricultural use and valuable material that, once processed, can become new biostimulants and biopesticides that boost agricultural production.

An example of the circular economy that was presented at the latest COP25 in Madrid and is one of the 101 Examples of Actions by Businesses #ForTheClimate.

The challenge is now before us. Actions that will change society's current path must be implemented without delay.

Biotechnology companies will be a big part of the solution, so although it's highly likely that your company is already collaborating, supporting or fostering the SDG, think about how you can truly commit to achieving them.

If each of us does just one more thing, it could make a difference in the end result and in achieving the SDG, which is a race we can't afford to lose.

Biorizon biotech

IF YOU DON'T INVEST IN THE FUTURE, YOU HAVE NO FUTURE

R&D investment must lead the change in economic model we want for Spain. PharmaMar is known for leading R&D investment in Spain throughout its history. Our R&D investment has been over 40% every year in recent times. Our current success and potential as a company is the direct result of this investment.
Three drugs approved for four different therapeutic indications. Yondelis® (trabectedin) gained authorisation for treatment of advanced soft-tissue sarcoma and ovarian cancer in 2007 and 2009, respectively, in Europe, and later in the United States and Japan.
It is currently on the market in over 80 countries. Aplidin® (plitidepsin) has been approved for the treatment of multiple myeloma in Australia since 2018. And our most recent success, Zepzelca® (lurbinectedin), gained FDA approval for treatment of metastatic small-cell lung cancer in the US.

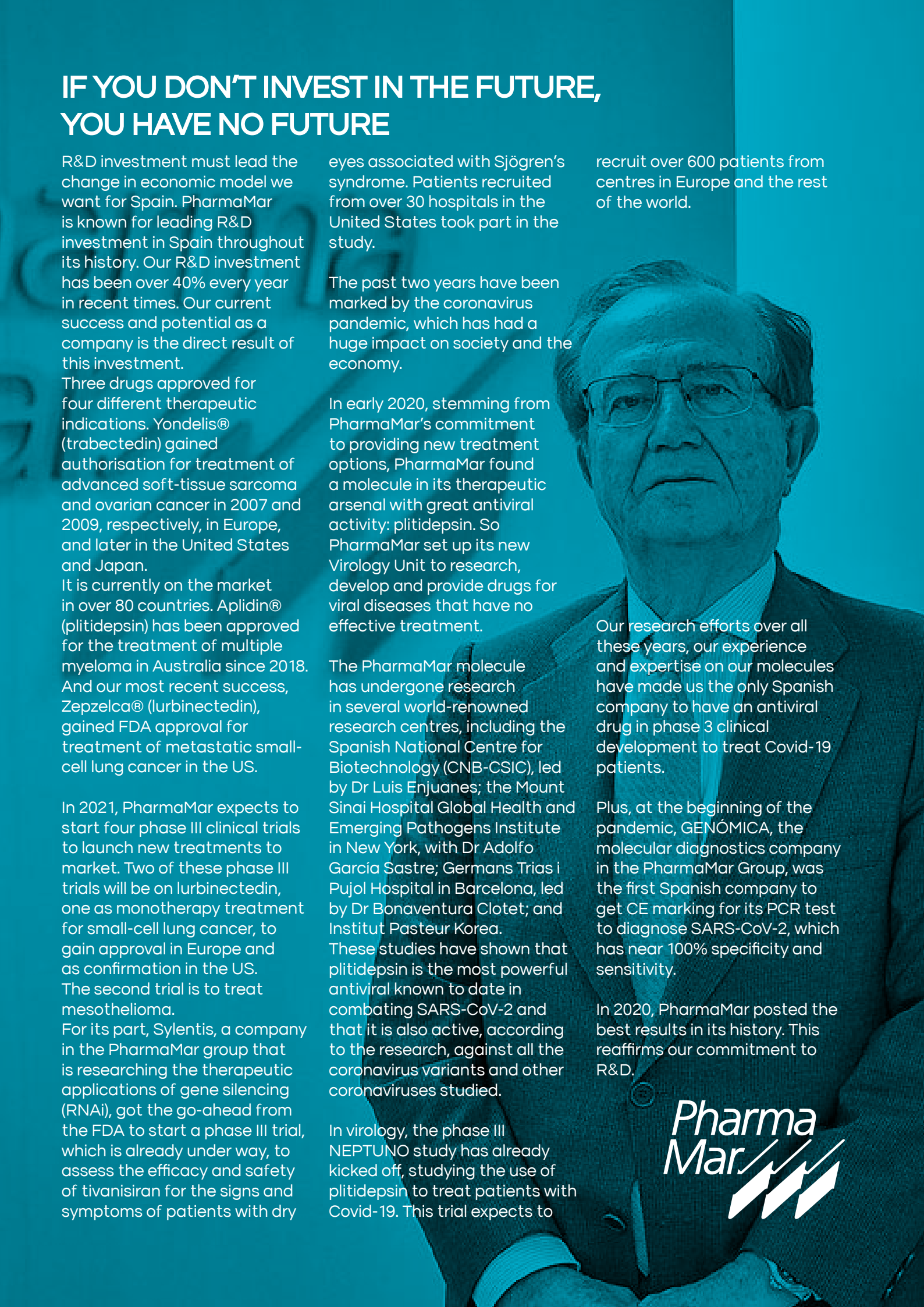
In 2021, PharmaMar expects to start four phase III clinical trials to launch new treatments to market. Two of these phase III trials will be on lurbinectedin, one as monotherapy treatment for small-cell lung cancer, to gain approval in Europe and as confirmation in the US. The second trial is to treat mesothelioma.
For its part, Sylentis, a company in the PharmaMar group that is researching the therapeutic applications of gene silencing (RNAi), got the go-ahead from the FDA to start a phase III trial, which is already under way, to assess the efficacy and safety of tivanisiran for the signs and symptoms of patients with dry eyes associated with Sjögren's syndrome. Patients recruited from over 30 hospitals in the United States took part in the study.

The past two years have been marked by the coronavirus pandemic, which has had a huge impact on society and the economy.

In early 2020, stemming from PharmaMar's commitment to providing new treatment options, PharmaMar found a molecule in its therapeutic arsenal with great antiviral activity: plitidepsin. So PharmaMar set up its new Virology Unit to research, develop and provide drugs for viral diseases that have no effective treatment.

The PharmaMar molecule has undergone research in several world-renowned research centres, including the Spanish National Centre for Biotechnology (CNB-CSIC), led by Dr Luis Enjuanes; the Mount Sinai Hospital Global Health and Emerging Pathogens Institute in New York, with Dr Adolfo García Sastre; Germans Trias i Pujol Hospital in Barcelona, led by Dr Bonaventura Clotet; and Institut Pasteur Korea.
These studies have shown that plitidepsin is the most powerful antiviral known to date in combating SARS-CoV-2 and that it is also active, according to the research, against all the coronavirus variants and other coronaviruses studied.

In virology, the phase III NEPTUNO study has already kicked off, studying the use of plitidepsin to treat patients with Covid-19. This trial expects to recruit over 600 patients from centres in Europe and the rest of the world.



Our research efforts over all these years, our experience and expertise on our molecules have made us the only Spanish company to have an antiviral drug in phase 3 clinical development to treat Covid-19 patients.

Plus, at the beginning of the pandemic, GENÓMICA, the molecular diagnostics company in the PharmaMar Group, was the first Spanish company to get CE marking for its PCR test to diagnose SARS-CoV-2, which has near 100% specificity and sensitivity.

In 2020, PharmaMar posted the best results in its history. This reaffirms our commitment to R&D.

PharmaMar

WHO'S WHO?

BOARD OF DIRECTORS

WHO'S WHO?

ANA POLANCO
CHAIRWOMAN
-MERCK

BELÉN BARREIRO
1st VICE-PRESIDENT
- INGENASA

ELENA RIVAS
2nd VICE-PRESIDENT
- ARRAYS FOR CELL NANODEVICES

JAVIER TERRIENTE
3rd VICE-PRESIDENT
- ZECLINICS

DÁMASO MOLERO
3P BIOPHARMACEUTICALS

ANTONIO BAÑARES
ABBVIE

CARLES DOMENECH
ABILITY PHARMA

AUGUSTO RODRÍGUEZ -VILLA
ALGAENERGY

MEMBERS

WHO'S WHO?

ROCÍO ARROYO
AMADIX

SANTIAGO DE TORRES
ATRYS HEALTH

JAVIER SALDAÑA
AYMING

RICHARD BORREANI
BAYER

CHRISTIAN SÁNCHEZ
NANOIMMUNOTECH

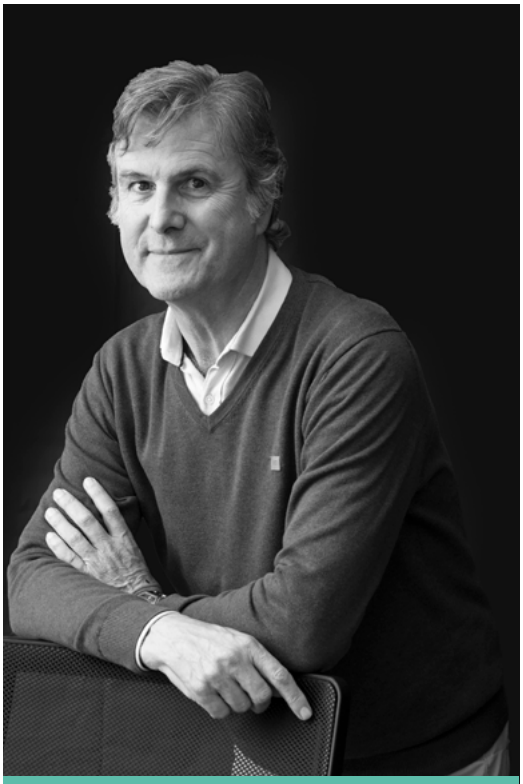
ENRIQUE SAMPER
NIMGENETICS

ENRIQUE CASTELLÓN
CRB INVERBÍO

BELÉN SOPESÉN
PHARMAMAR

MEMBERS

ANTONIO LÓPEZ
SCIENCE & INNOVATION
LINK OFFICE



GURUTZ LINAZASORO
VIVEBIOTECH

ANDRÉS BALLESTEROS
VIVIA BIOTECH

WHO'S WHO?

HEALTHCARE COMMITTEE
LED BY ENRIQUE CASTELLÓN (CRB INVERBÍO)

Goals

• To influence regulatory processes that affect the application of biotechnology in healthcare.

• To help develop and improve the national health system, promoting access to biotechnological innovation that is compatible with the sustainability of the system.

• To raise awareness of the contributions biotechnology makes to help and further recognition as a sector that generates a lot of value added.

• To lead collaboration and partnership initiatives with stakeholders in the public and private sectors that foster innovation in healthcare and new technology and public policies that valorise R&D throughout the chain.

Workgroups

• **Market Access.** Coordinator: Beatriz Perales (SOBI).

• **Personalised Medicine and Advanced Diagnostics.** Coordinator: Ana Martín (Amadix).

• **Drug discovery.** Coordinator: Arsenio Nueda (Almirall).

• **Advanced Therapies.** Coordinator: Gurutz Linazasoro (VIVEBiotech).

COMMITTEE

FUNDING, INTERNATIONALISATION AND TECHNOLOGY TRANSFORMATION COMMITTEE.
LED BY SANTIAGO DE TORRES (ATRYS HEALTH)

WHO'S WHO?

Goals

• To carry out actions to bring about a framework of incentives that encourages R&D and investment to cover funding needs, especially in SMEs.

• To facilitate internationalisation by putting in place measures that facilitate access to complex markets.

• To encourage participation in international R&D projects, and to lead them.

• To facilitate development of the connection between biotechnology and new technology.

• To contribute, alongside other social and institutional stakeholders, to achieving the goals on the 2030 Agenda.

• To promote a regulatory framework based on ethical and bioethical needs to ensure safety.

Workgroups

• **Funding R&D and business development.** Coordinator: Carmen Eibe (Pharmamar).

• **Biotechnology and Digitalisation.** Coordinator: Elisa Díaz (Merck).

• **New markets for Spanish biotechnology**. Coordinator Antonio López (SILO).

• **Venture Capital.** Coordinator: Clara Campàs (Asabys Partners).

AGRIFOOD COMMITTEE

LED BY
RICHARD BORREANI
(BAYER CROPSSCIENCE)

Goals

• To promote an appropriate, stable regulatory framework in Spain and Europe that can facilitate the contributions of biotechnology to agrifood production and environmental conservation.

• To continue putting agrifood biotechnology on the agenda of public institutions and governments, encouraging measures to promote and support the sector.

• To boost visibility and recognition of biotechnology for agrifood and the role it plays in ensuring safe, sustainable, quality nutrition.

• To raise awareness of and communicate the positive impact biotechnology has on land use, food security and better nutrition, water management and preserving ecosystems, offering up solutions to our planet's sustainability challenges in line with the 17 sustainable development goals on the 2030 Agenda.

Workgroups

• **Sustainable agriculture and healthy eating.** Coordinator Richard Borreani (Bayer CropScience).

INDUSTRIAL TRANSFORMATION COMMITTEE

LED BY
CARLOS RODRÍGUEZ-VILLA
(ALGAENERGY)

Goals

• To influence the regulatory and political arenas to drive research and innovation, aid for industrial biotechnology and its presence in national and international projects.

• To put in place measures that drive and strengthen Spanish biotech so it will be recognised as a hub of knowledge and high technology, as it is in the most advanced countries around us.

• To support internationalisation of industrial services companies, helping them break into the global market.

Workgroups

• **Bioeconomy, circular economy and industrial sustainability.** Coordinator: Carlos Rodríguez-Villa (AlgaEnergy).

ASSOCIATION AND TALENT COMMITTEE

LED BY ELENA RIVAS
(A4CELL)

Goals

• To foster synergies among members in order to boost their potential with comprehensive service through collaboration and involvement.

• To facilitate networking, connections among members, and to foster collaboration among public and private institutions.

• To channel members' needs and concerns.

• To generate a framework for actions to encourage young talent.

• To boost partnering with the university arena and dissemination of biotechnology through universities.

• To help valorise diversity and inclusion, particularly gender equality.

Workgroups

• **Communication and social impact.** Coordinator: Javier Velasco (Bioibérica).

• **Talent and Diversity.** Coordinator: Tomás Alarcón (3P Biopharmaceuticals).

BUSINESS MEMBERS

3P BIOPHARMACEUTICALS

ABBVIE

ABILITY PHARMACEUTICALS

ACCURE THERAPEUTICS

ACKERMANN INTERNATIONAL

ADDITUM BLOCKCHAIN

ADL BIONATUR SOLUTIONS

ADL BIOPHARMA

ADM BIOPOLIS

ADMIT THERAPEUTICS

ADNTRO

ABT AGAROSE BEAD TECHNOLOGIES

AGRENVEC

AGROCODE BIOSCIENCE

AKRN CONSULTING

WHO'S WHO?

ALCALIBER

ALGAENERGY

ALGENEX

ALLINKY BIOPHARMA

ALMIRALL

ALTA LIFE SCIENCE

AMADIX

AMGEN

AMS BIOPHARMA LABORATORY

ANTARES CONSULTING

APTATARGETS

APTUS BIOTECH

AQUILÓN CYL

ARACLON BIOTECH

ARCHIVEL FARMA

ARRAYS FOR CELL NANODEVICES

ARTHEX BIOTECH

ARTINVET

ASABYS PARTNERS

ASCIL BIOPHARM

ASPHALION

ASTRAZENECA

ATRYS HEALTH

AYMING

AZUR GLOBAL NUTRITION EUROPE

BAYER CROPSCIENCE

BCN HEALTH

BUSINESS MEMBERS

BDI (BIOTECHNOLOGY DEVELOPMENT FOR INDUSTRY)

BEST MEDICAL DIET

BIOBIDE (BBD BIOPHENIX)

BIOSCROSMO

BIOCROSS

BIOHOPE SCIENTIFIC SOLUTIONS FOR HUMAN HEALTH

BIOIBÉRICA

BIOINGENIUM

BIOKIT

BIOLAN

BIOLAN HEALTH

BIOMAR MICROBIAL TECHNOLOGIES

BIOMARIN

BIOMEDICA MOLECULAR MEDICINE

BIONET INGENIERÍA

WHO'S WHO?

BIONOS BIOTECH

BIOREPOS

BIORIZON BIOTECH

BIOSEARCH LIFE

BIOSEQS GENOMICS

BIOSERENTIA

BIOSFER TESLAB

BIOTECHVANA

BIOTOOLS

BRISTOL MYERS SQUIBB

BTI BIOTECHNOLOGY INSTITUTE

CAIXA CAPITAL RISC

CANVAX BIOTECH

CAPITAL CELL

CARTHAGENETICS

CIMERA (CELLAB)

CELGENE

CESIF

COOL CHAIN LOGISTICS

CORIFY CARE

CRAZY SCIENCE & BUSINESS

CRB INVERBIO

CULTIPLY

D&B TECNOLOGÍA

DERMA INNOVATE

DINAMIZA

DIOMUNE

BUSINESS MEMBERS

DOBECURE

DOITPLENOPTIC

DR. HEALTHCARE

DREAMGENICS

DROPLITE TECHNOLOGIES

DSM

ELZABURU

ENTRECHEM

ENZYMLOGIC

EUROGENETICS

EURONEXT

EUROPEAN RESEARCH BIOLOGICAL CENTER (ERBC)

FERRER

FITALENT

GATE2BRAIN

WHO'S WHO?

GÉNESIS BIOMED

GENETRACER BIOTECH

GENÓMICA

GILEAD

GRADOCELL

GSK (GLAXOSMITHKLINE)

GRIFOLS

GRIFOLS ENGINEERING

GRUPO BME (MAB. BOLSAS Y MERCADOS ESPAÑOLES)

GRUPO CELLUS

HIGHLIGHT THERAPEUTICS

HISTOCELL

HOFFMANN EITLE

IGEN BIOTECH

IKAN BIOTECH

ILLUMINA

IMERETI

IMMUNOSTEP

INCYTE

INGENASA

INGULADOS RESEARCH

INHIBITEC ANTICUERPOS

INNOQUA TOXICOLOGY CONSULTANTS

INNOUP FARMA

INSTITUTO EMPRESARIAL DE BIOTECNOLOGÍA

INTEGROMICS

INVIVO CAPITAL PARTNERS

BUSINESS MEMBERS

IUL

INVEREADY

ISERN PATENTES Y MARCAS

JANSSEN-CILAG

LABGENETICS

LABORATORIOS LETI

LABORATORIOS RUBIÓ

LAMINAR PHARMA

LENTISTEM BIOTECH

LEUKOS BIOTECH

LIFE LENGHT

LIFESEQUENCING

LIM GLOBAL

LIMNOPHARMA

LONZA

WHO'S WHO?

MABXIENCE

MEDMESAFE

MERCK

MICROOMICS

MILTENYI BIOTEC

MINORYX THERAPEUTICS

MSD

MYRIAD

NANOIMMUNOTECH

NANOLIGENT

NATAC GROUP

NEURAL THERAPIES

NEUROFIX

NIMGENETICS

NORAY BIOSCIENCES GROUP

NORAYBIO

NOSTRUM BIODISCOVERY

NOVARTIS

NOVO NORDISK

NOWTURE

NUCAPS NANOTECHNOLOGY

OMAKASE CONSULTING

ONA THERAPEUTICS

ONCOHEROES BIOSCIENCES

ONECHAIN IMMUNOTHERAPEUTICS

ONENA MEDICINES

OPERON

BUSINESS MEMBERS

ORYZON GENOMICS

OWL

PALOBIOFARMA

PEACHES BIOTECH

PEPTOMYC

PEVESA

PHARMAMAR

PLANTRESPONSE

PROGENIE MOLECULAR

PROGENIKA BIOPHARMA

PROMEGA

PROTEOS BIOTECH

PROTOQSAR

QGENOMICS

QUALITECFARMA

WHO'S WHO?

REIG JOFRE

REMAB THERAPEUTICS

ROCHE FARMA

SANIFIT

SARTORIUS STEDIM

SCIENCE & INNOVATION LINK OFFICE (SILO)

SECUGEN

SERMES CRO

SIGMA-ALDRICH QUÍMICA

SISTEMAS GENÓMICOS

SOM BIOTECH

SPECIPIG

SOBI (SWEDISH ORPHAN BIOVITRUM)

SYLENTIS

TEBRIO

TECBIOCEL, S.L.

TECNIC

TECNIC BIOTECH

TIGENIX

TRESCA INGENIERÍA

VAXDYN

VCN BIOSCIENCES

VENTER PHARMA

VETGENOMICS

VITRO

VIVACELL BIOTECHNOLOGY

VIVEBIOTECH

BUSINESS MEMBERS

VIVIA BIOTECH

VIVOTECNIA RESEARCH

VLPBIO

WHOLE GENIX

WORLD COURIER

YSIOS CAPITAL PARTNERS

ZECLINICS

ZENDAL (BIOFABRI)

ZYMVOL BIOMODELING

WHO'S WHO?

MEMBERS

AGENCIA DE INNOVACIÓN Y DESARROLLO DE ANDALUCÍA (IDEA)

AINIA

BANCO ESPAÑOL DE ALGAS

BASQUE HEALTH CLUSTER

BIOCAT

BIOFARMA

BIOIB

BIOVAL

FUNDACIÓN CENER-CIEMAT

CENTRO DE INVESTIGACIONES CIENTÍFICAS Y TECNOLÓGICAS DE EXTREMADURA (CICYTEX)

CIBER

CNIO

CSIC

FEDERACIÓN ASEM

FIBAO

FIMABIS

FISEVI

FUNDACIÓ CENTRE DE REGULACIÓ GENÒMICA (CRG)

FUNDACIÓN GEICAM

UNDACIÓN IMDEA ALIMENTACIÓN

FUNDACIÓN MEDINA

WHO'S WHO?

MEMBERS

FUNDACIÓN PCTAD

FUNDACIÓN PROGRESO Y SALUD

GENMIC

GOBIERNO DE LA RIOJA. DG INNOVACIÓN

IMIBIC

INSTITUTO DE BIOMEDICINA DE SEVILLA (IBIS)

INSTITUTO PARA LA COMPETITIVIDAD EMPRESARIAL (ICE)

INSTITUTO DE I NVESTIGACIÓN SANITARIA FUNDACIÓN JIMÉNEZ DÍAZ

INSTITUTO DE INVESTIGACIÓN SANITARIA HOSPITAL 12 DE OCTUBRE (I+12)

INSTITUTO DE INVESTIGACIÓN SANITARIA LA FE

INSTITUTO RAMÓN Y CAJAL DE INVESTIGACIÓN SANITARIA

INSTITUTO DE SALUD CARLOS III

IQS

IRB BARCELONA

LEITAT

WHO'S WHO?

NEIKER

PARC CIENTÍFIC DE BARCELONA

PARQUE CIENTÍFICO DE MADRID

PROEXCA

PROYECTO CLAMBER

PTS GRANADA

SOCIEDAD ESPAÑOLA DE BIOQUÍMICA Y BIOLOGÍA MOLECULAR (SEBBM)

SOCIEDAD ESPAÑOLA DE HEMATOLOGÍA Y HEMOTERAPIA

SOCIEDAD ESPAÑOLA DE NEUROCIENCIA (SENC)

SODENA

UNIVERSIDAD CEU SAN PABLO

UNIVERSIDAD EUROPEA DE MADRID

UNIVERSIDAD DE NAVARRA

VETERINDUSTRIA

METHODOLOGY

CHAPTER 1 - R&D INVESTMENT

For this chapter we compiled the results of the 2019 Survey on Biotechnology Use and statistics on R&D activities from the National Statistics Institute. 2019.

https://www.ine.es/dyngs/INEbase/es/operacionhtm?c=Estadistica_C&cid=1254736176808&menu=ultiDatos&idp=1254735576669

CHAPTER 2 - FUNDING

The data in chapter 2 was compiled from information from the State Research Agency (AEI), the Spanish Venture Capital and Private Equity Association (ASCRI), the National Innovation Company (ENISA), the Centre for the Development of Industrial Technology (CDTI), members and the press.

CHAPTER 3 - TALENT AND DIVERSITY

To obtain the data on the evolution of the number of students enrolled in university studies in biotechnology, we used data from the Statistics on University Students of the Secretary of State for Universities, Ministry of Science, Innovation and Universities,

(https://www.ciencia.gob.es/portal/site/MICINN/menuitem.26172fcf4eb029fa6ec7da6901432ea0/?vgnextoid=9b238e2eb3856610VgnVCM1000001d04140aRCRD)

and selected data from the past three years for all universities that offer undergraduate studies in biotechnology.

To obtain the data on number of researchers, female researchers and female representation, we used the INE 2019 Survey on Biotechnology Use and Statistics on R&D activities.

https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176808&menu=ultiDatos&idp=1254735576669

For the data on the productivity and salaries of employees at biotech firms, we used the sample of companies compiled by AseBio.

To obtain the data on number of women in leadership positions at biotechnology companies, we used data from the Companies Houses and website of companies in the sector, as well as data from the INE and the Institute of Women. Ministry of Equality.

https://www.inmujeres.gob.es/MujerCifras/CienciaTecnologia/Empleo.htm

CHAPTER 4 - BUSINESS FABRIC

This section was compiled as follows:
• To reflect the number of biotechnology companies, and their breakdown by the field they apply biotechnology in, size and geographic location, we compiled data from the INE Survey on Biotechnology Use and the list of biotechnology companies identified by AseBio.

• To put together the list of biotechnology companies started in 2020, we requested information from various entities in the main Autonomous Communities with biotechnology activity.
• Plus, to put together the map of biotech-related facilities, we analysed the main Autonomous Communities.

CHAPTER 5 - ENVIRONMENTAL CONDITIONS

To find out society's perception, we compiled data from the two surveys FECYT did on social perception of the scientific aspects of Covid-19.

The data on people's willingness to get vaccinated comes from the results of the surveys conducted by the Centre for Sociological Research (CIS) and FECYT.

Plus, data was also compiled from the results of the FECYT Survey on Social Perception of Science and Technology

(https://icono.fecyt.es/informes-y-publicaciones/percepcion-social-de-la-ciencia-y-la-tecnologia-en-espana)

and the COTEC Survey on Social Perception of Innovation

(http://informecotec.es/media/IIIEncuestaPercepcionSocialInnovacionEspa%C3%B1a.pdf).

The data on perception of the biotechnology sector was obtained from a survey of AseBio members, who were asked to rate 20 factors on how they had affected the biotechnology sector in 2020.

Plus, it also reflects the main conclusions of the AseBio survey of its members to find out how the pandemic has impacted the biotechnology sector.

https://www.asebio.com/sites/default/files/2021-01/20201120_An%C3%A1lisis%20Encuesta%20impacto%20COVID-vf.pdf

CHAPTER 6 - RESULTS OF THE BIOTECH SECTOR

To compile this chapter we obtained information from the following sources:

In the section of production of scientific knowledge, we included the main indicators for Spanish scientific production in biotechnology, provided by the Spanish Foundation for Science and Technology (FECYT), based on data from the Elsevier SciVal

tool, which contains the scientific production from the Scopus database.

Normalised impact is an indicator that compares similar publications, in terms of year published, category and document type. A NI of 1.0 means the paper is cited as often as the global average. A NI of 2.0 means the paper is cited twice as often as the global average.

• To come up with the number of scientific publications by AseBio members in 2020, we requested information from members on their scientific publications in biotechnology, not including communications or posters at congresses or fairs, or publications signed by research centres or universities that don't cite the relationship with studies for business projects.

• The data on patents was obtained for AseBio in a study carried out by the Madrid Science Park based on the ClarkeModet database.

The information was obtained using the methodology designed by ClarkeModet and the Madrid Science Park, based on OECD definitions for the biotechnology sector. The Thomson Reuters (now Clarivate Analytics) databases were used. Plus, we checked the public databases of the various offices: Spanish Patent and Trademark Office (OEPM), European Patent Office (EPO), United States Patent and Trademark Office (USPTO), Japan Patent Office (JPO) and the World Intellectual Property Organisation (WIPO).

• The advances in development were compiled from press publications or the websites of AseBio members.

• Both the section on products and services launched in 2020 and their distribution by areas of activity were put together by consulting AseBio members.

CHAPTER 7 - COLLABORATION AND INTERNATIONALISATION

The information on international presence of AseBio members was compiled from their websites and by consulting them directly.

The results on partnerships established by biotech companies were obtained from members and by checking press releases from the various organisations.

CHAPTER 8 - IMPACT

The data for sections 8.1 and 8.2 in chapter 8 was obtained from a sample of companies collection by AseBio and from the Survey on Biotechnology Use conducted by the National Statistics Institute (INE).

We systematically collected and processed registry information for all companies identified as biotech firms, processing their basic financial statements, balance sheets, and profit and loss statements to get a direct measurement of their business activity.

For each of these companies, we quantified their levels of basic production (turnover), employment, intermediate goods (products and services), value added, salaries (personnel expenditure)

and investment over the past 10 years (2009-2019) to get the cumulative levels for all biotech firms, extrapolating the results obtained to the overall totals identified by the INE.

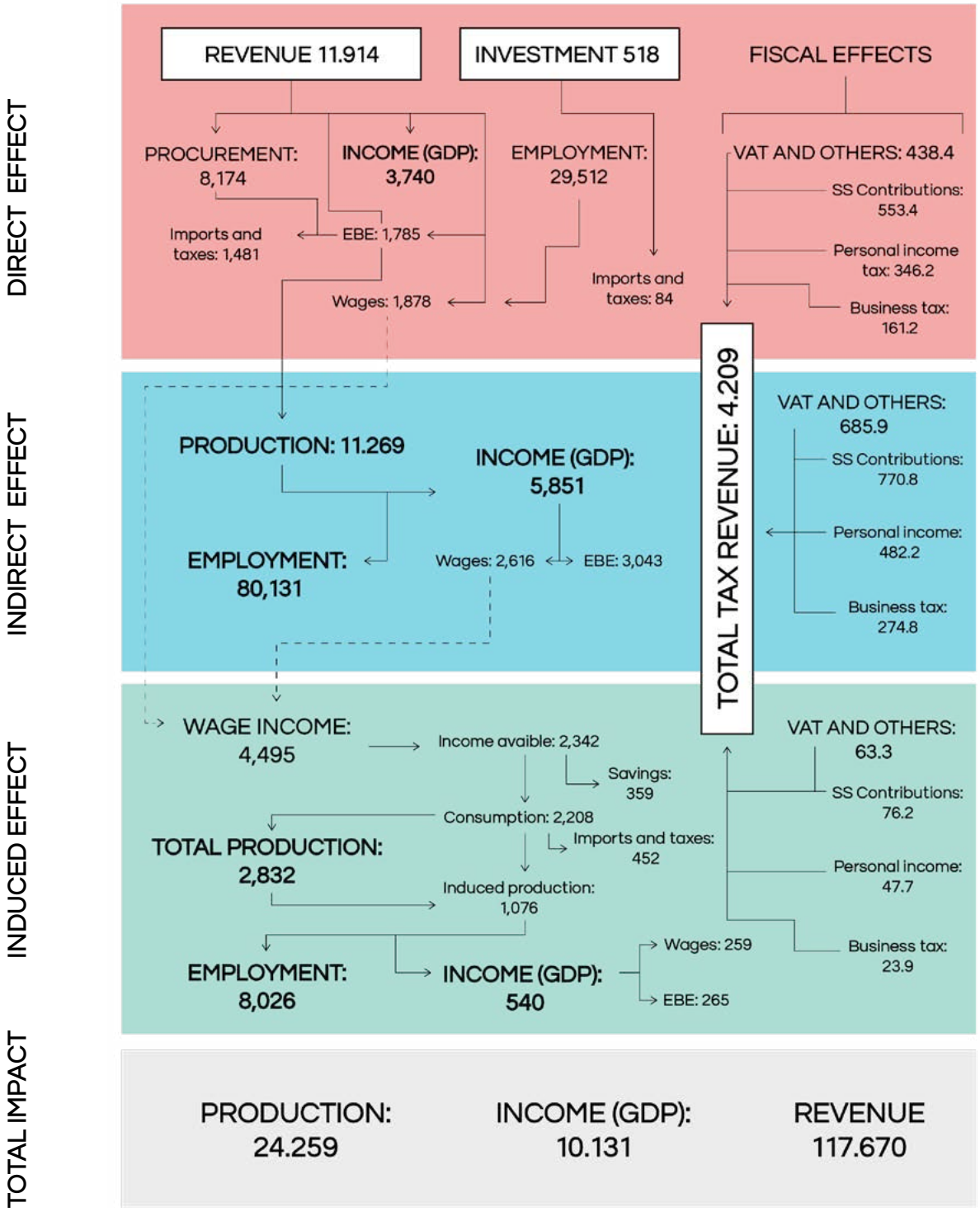
Alongside the detailed analysis of the biotech firms, we also moved forward in quantifying the corresponding levels for companies with biotechnology as a secondary activity and those that use biotechnology as a production tool, which along with biotech firms make up what we call the biotechnology sector.

For these companies, we started with the total employment figures in the INE survey and did an indirect estimation of the other benchmark levels, taking into account both the general ratios in the National Accounting and the specific ones for strictly biotechnology activities calculated previously.

From these figures, we calculated the overall economic impact of the activity carried out by these companies on the Spanish economy as a whole.

This way, using the standard methodology based on input-output tables, we calculated both the direct impact in terms of generating income (GDP), employment and tax revenue, and the induced impact generated by direct and indirect salaries dependent on this activity.

The following figure shows the sequence of calculations for the Impact chapter.


DIRECT EFFECT
INDIRECT EFFECT
INDUCED EFFECT
TOTAL IMPACT
REVENUE 11.914
INVESTMENT 518
FISCAL EFFECTS
PROCUREMENT: 8,174
INCOME (GDP): 3,740
EMPLOYMENT: 29,512
VAT AND OTHERS: 438.4
SS Contributions: 553.4
Personal income tax: 346.2
Business tax: 161.2
Imports and taxes: 1,481
EBE: 1,785
Wages: 1,878
Imports and taxes: 84
TOTAL TAX REVENUE: 4.209
PRODUCTION: 11.269
INCOME (GDP): 5,851
EMPLOYMENT: 80,131
Wages: 2,616
EBE: 3,043
VAT AND OTHERS: 685.9
SS Contributions: 770.8
Personal income: 482.2
Business tax: 274.8
WAGE INCOME: 4,495
Income avaible: 2,342
Savings: 359
Consumption: 2,208
Imports and taxes: 452
TOTAL PRODUCTION: 2,832
Induced production: 1,076
EMPLOYMENT: 8,026
INCOME (GDP): 540
Wages: 259
EBE: 265
VAT AND OTHERS: 63.3
SS Contributions: 76.2
Personal income: 47.7
Business tax: 23.9
PRODUCTION: 24.259
INCOME (GDP): 10.131
REVENUE 117.670

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