

aws Life Science Austria

Life Science Report Austria 2021

Introduction



For years, the life science sector in Austria has served as a lifesaver, employer, and a significant factor in the Austrian economy. However, the importance of the sector has definitely come to the fore with the coronavirus pandemic.

The figures of the Austrian life science statistics clearly speak for themselves, as they have for so many years. The life science sector is of high economic importance for the entire society and plays an essential role in our well-functioning healthcare system.

This report presents the key figures for biotechnology and pharma, as well as for medical technology and digital healthcare in Austria. In addition to the core sector, the report analyses the entire value chain of the life science sector including suppliers, service providers, sales and distribution companies, and is complemented by data on Austrian universities, universities of applied sciences and research institutions in life sciences.

The current figures demonstrate that Austria's efforts to support the Austrian life science scene during years has paid off. More than two decades of ongoing support in the funding environment in Austria show their outcome. One of the most important programs supporting the Austrian life science scene is aws LISA – Life Science Austria, which is managed by Austria Wirtschaftsservice. This initiative

offers customized support to life science startups in every development phase. Focusing on biotechnology/pharma, medical products as well as digital health, LISA encourages, coaches and fuels life science entrepreneurs, supports Austrian life science clusters and represents Austrian life science companies abroad. The support measures range from monetary support such as Preseed and Seedfinancing, LISA International Marketing to the international life science business plan competition "Best of Biotech" (BoB). Between 2015 and 2020 the program has been involved in the creation of 81 innovative SMEs and provided 29.5 million Euro of Preseed and Seedfinancing capital to support these companies.

To close a funding gap in early preclinical research and to bring good projects into the value chain we decided to invest in an international translational research fund in 2019. This fund transforms promising ideas from basic research into commercially viable product candidates that can be further developed by companies. Together with the European Investment Fund (EIF, Luxemburg) and the Max Planck Foundation (Munich, Germany), we committed in a first closing an investment of a total volume of 60 million Euro into KHAN-I for early-stage drug discovery projects. In Austria, the KHAN-I fund is represented by its subsidiary wings4innovation.

In recent years digitalization has become a significant driver of innovation in the life sciences, especially in the field of medical engineering. Particularly the combat against the coronavirus has still enhanced digitalization of the life science sector, but the pathway towards digital applications has been clearly perceptible yet for years. The current report demonstrates that the sector continues growing.

The fruitful cooperation between science and economy clearly proves that Austria is a great location for small as well as large companies and the current figures explicitly demonstrate that Austria is the place to be for working in the life sciences.

Dr. Margarete Schramböck
Federal Minister for Digital and Economic Affairs

Preface



The Austrian life science sector has emerged as an important player in global competition over the last few years. Finally, the current pandemic has enabled innovative start-ups and researchers in this economic sector to show what they are capable of.

What makes Austria an interesting place for the life sciences are the close links between solid academic research and outstanding medical practice, access to highly-skilled and dedicated scientists and managers, paired with an active start-up community, and last, but certainly not least, an extremely effective government support system for innovative companies. Government support measures are needed, particularly in the early development phase, in such a research-intensive sector like life sciences, which also features very long product cycles. This assistance aims at preventing market failure. The boom in the Austrian life science sector is based on fertile ground provided by public funding programmes over the last 20 years.

Austria Wirtschaftsservice, the Austrian national promotional bank, provides financial support for start-up ideas for life-sciences through its funding programmes 'aws LISA PreSeed' and 'aws LISA Seedfinancing'. Furthermore, there is a whole range of other support options for life science companies in Austria. Life science project ideas leading to the establishment of companies are provided with the tools to implement commercially scalable business models on

the basis of the international business plan competition aws BoB – Best of Biotech. Startups from an academic environment are also given special support in the early phase of corporate development via the incubators funded by the aws AplusB-scale up programme. In addition, life science companies in growth phases can take advantage of financing by the Venture Capital Initiative, founder and SME funds as well as guarantee and loan instruments. The funding provided along the entire value chain is complemented by consulting and patent funding.

In order to reflect the life science sector as a whole, we have collected data not only from companies, but also from the Austrian research sector to provide an overview of the basic and applied research performed at Austrian universities and research institutes.

The close links between solid academic research and outstanding medical practice, access to highly-skilled and dedicated scientists and managers, paired with an active start-up community and an extremely effective government support system for innovative companies make Austria a very interesting place for life sciences.

The Austrian government is committed to this burgeoning sector and is helping to foster a business environment that allows such young spin-off companies to thrive.

All these measures are now bearing fruit, creating new and exciting jobs while securing Austria's future as a hot spot for innovation. The Austrian life science sector promises to continue having a successful and exciting future.

We hope to have captured your attention for the Austrian Life Science Report 2021 where you can read many facts and figures demonstrating the success of the Austrian life science industry!

Mag.^a Edeltraud Stiftinger
Managing Director Austria Wirtschaftsservice GesmbH

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1. Life Science Report Austria 2021

Life Science Sector in Austria

The life sciences in Austria have a long tradition that is characterized by revolutionary discoveries. This tradition forms the basis of a dynamic scene of researchers, clinicians and entrepreneurs. Nowadays, Austria established an excellent network of renowned academic institutions, global players, family-owned businesses and innovative start-ups. Moreover, excellent networks connecting science and industry have been developed to improve the innovation outcome for the society.

Thus, all stakeholders in the Austrian life sciences contribute to a highly attractive sector. However, the system is facing numerous challenges. Whether it is the aging of society, digitalization, the increasing cost pressures in healthcare systems or climate change – the life sciences are considered to be among the key technologies for providing solutions. Situated in the middle of Europe, Austria has taken advantage of its geographical location to be a forerunner of innovation.

Austria's life science industry in figures

With 982 companies active in biotechnology, pharma or the medical devices business, life sciences are an important and constantly growing part of the Austrian economy. In 2020, seven percent more businesses were located in Austria compared to 2017. These companies were responsible for a turnover of 25.1 billion euros. From 2017, revenues increased substantially by 12.1%. The life science companies also employ a large chunk of the Austrian workforce. In 2020, more than 60,000 people earned a living working for an Austrian life science company, which means an increase of 8.9% compared to 2017.

The life science industry in Austria is fully diversified and basically consists of two equally important subsegments: biotechnology and pharma on the one hand, medical devices on the other. Although employing a similar number of people, in terms of total company numbers, the medical device sec-

tor (577 companies) is slightly stronger than the biotech and pharma sector (405 companies). Addressing the turnover, a different picture emerges: the biotechnology and pharma had revenues of 16.03 billion euros in 2020, while the turnover in the medical devices industry recorded 9.03 billion euros. Thus, the key figures highlight that the life sciences are an important pillar in the Austrian economy. Whether it is with respect to research, development and manufacturing or to suppliers, service providers, sales and distribution specialists – the sector has emerged as an exceptional driver of economic growth, innovation and novel jobs.

Excellence in research

The strong economic development of Austria's life sciences is supported by a tight network of internationally renowned research expertise. A total of 55 institutions are completely dedicated to life science research or have significant activities in this field. Altogether, more than 24,000 life sciences related employees are working at 17 universities, 13 universities of applied sciences and 25 non-university research institutes, building the innovative foundation of the Austrian life science sector as a whole. Besides high-quality research, the academic institutions also provide the sector with well-qualified people, representing a strong pillar in Austria's educational system. In 2020, the total number of life science students at universities and universities of applied science amounted to more than 77,000.

The information in this brochure is the result of a survey conducted by BIOCUM AG between April and June, 2021, on behalf of the Austrian Federal Ministry of Digital and Economic Affairs and Austria Wirtschaftsservice Gesellschaft mbH (aws). The collection of data followed internationally accepted guidelines and definitions set out by the Organization for Economic Cooperation and Development (OECD; biotechnology section) and the Global Medical Device Nomenclature (GMDN; medical devices section).

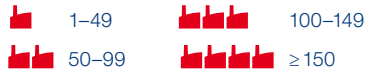
	2012	2014	2017	2020
Number of companies in the life science industry	723	823	917	982
Number of employees in the life science industry	50,180	51,660	55,480	60,440
Turnover in the life science industry	EUR 17.73bn	EUR 19.11bn	EUR 22.4bn	EUR 25.1bn
Number of research and education institutions active in life sciences	n.a.	55	55	55
Number of life science employees in research and education institutions	n.a.	19,830	21,145	24,294

Table 1: Key figures for the life science sector in Austria 2012, 2014, 2017, 2020

Map of the Life Science Sector

Distributed According to Federal States

Number of life science companies



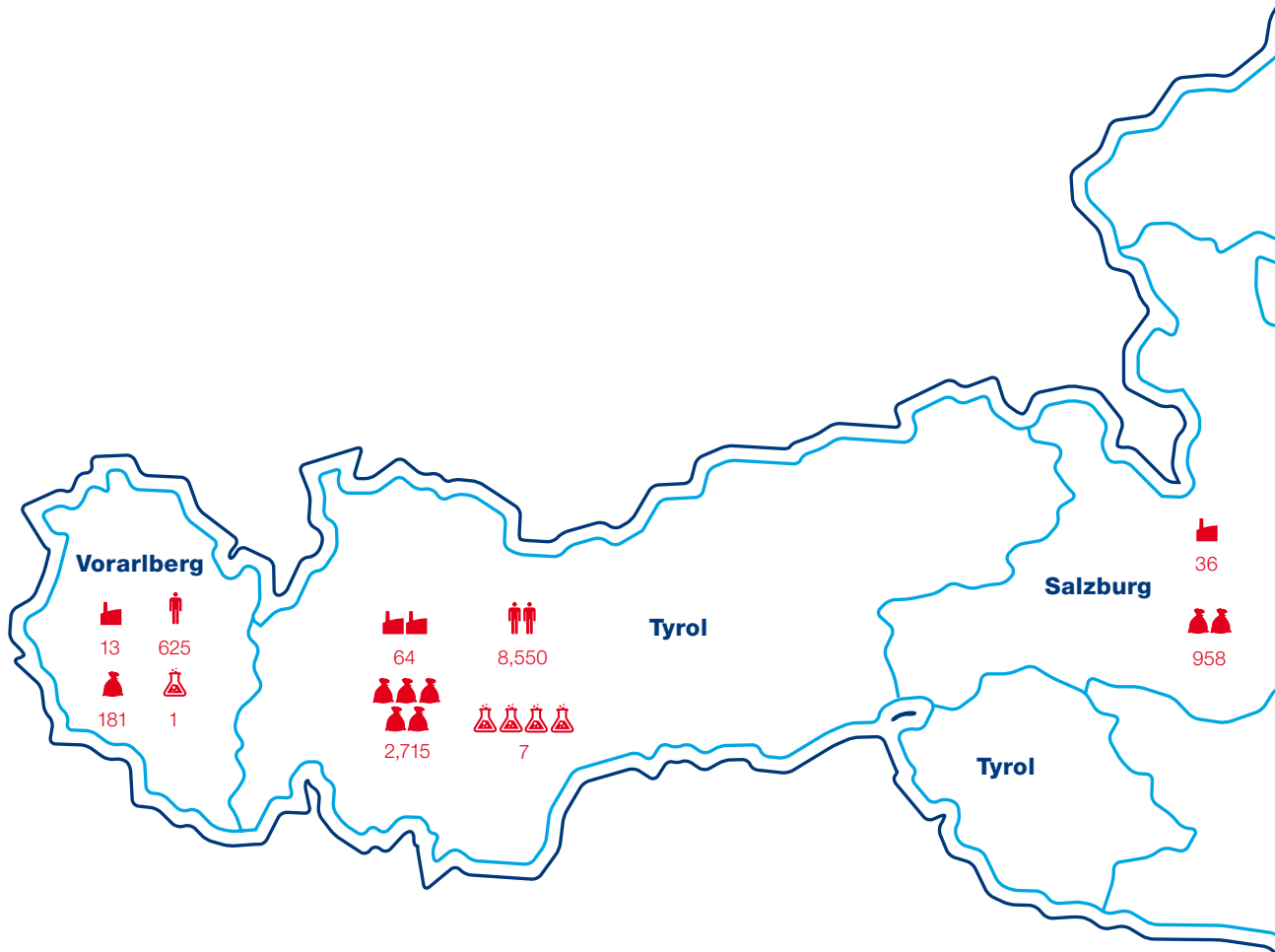
Number of employees in life science companies

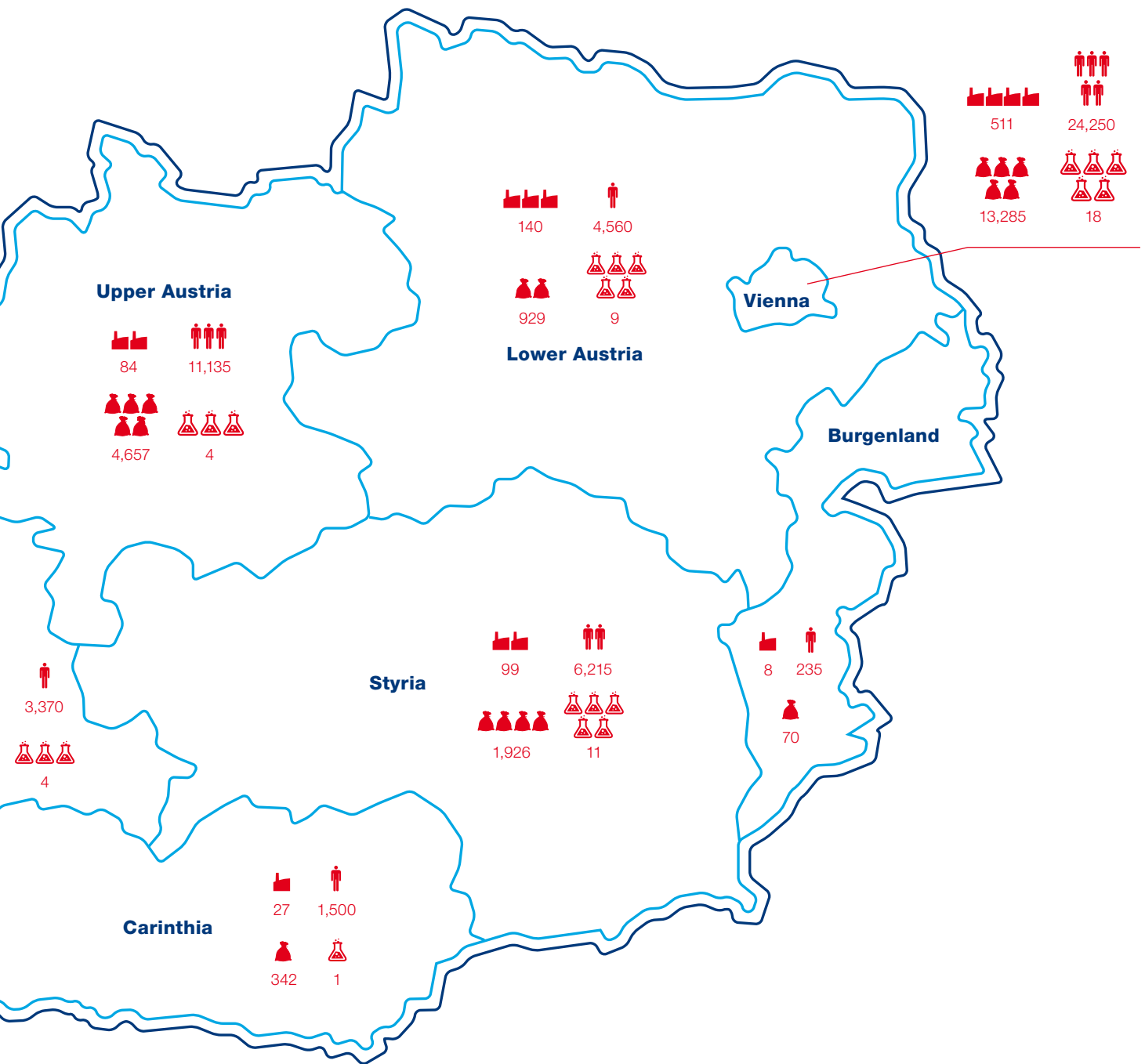


Turnover of life science companies (in € m)



Number of research and education institutions active in life sciences





2. Biotechnology and Pharma in Austria

Overview

Innovative solutions from biotechnology and pharma are crucial in tackling challenges such as demographic change or to fight against biological threats like COVID-19. Novel vaccines and innovative drugs will pave the road to cures for diseases that are currently hard to treat and protect against lethal infections. In recent decades, Austria has established a solid position. The country's central geographical position, combined with the highly qualified workforce available in Austria and the broad technical and scientific expertise, has placed the Austrian biotech and pharma sector firmly on the European life science map.

These companies can play an essential role in developing the medicine of the future, be it a treatment for emerging infectious diseases, vaccines or diagnostic tools. Positioned in the heart of Europe, they form a hub for the entire continent acting as an interface linking east and west.

Dynamic growth rates for biotech and pharma companies

The Austrian biotechnology and pharma industry is growing at a tremendous pace. In the last three years, 42 companies in the biotechnology and pharma sector became operative. The dynamic rate of growth confirms the significance of biotechnology and pharma in Austria. The sector continues to be a significant economic factor and a driver for innovation in the healthcare field. This is underlined by revenues exceeding 16 billion euros.

Based on the survey, a total of 405 companies are active in the fields of biotechnology and pharma – an increase of 11.6% compared to 2017. This figure includes the 235 'research, development or manufacturing companies' that consist of 'dedicated biotechnology companies', 'other biotechnology active' and 'pharma companies' (for definitions, see page 47) and the 170 specialized service providers, suppliers, and sales and distribution companies (for methodology, see page 45).

All in all, the 405 biotechnology and pharma companies generated 16.03 billion euros of turnover in 2020, which means an increase of 15% compared to 2017. With revenues of 11.14 billion euros, the research, development and manufacturing companies contributed about twice as much as the supply, service and sales companies (4.89 billion euros).

In 2020, most of staff employed by the biotechnology and pharma companies worked in the research, development or manufacturing companies: 25,350 of 32,020 people earned their living in this field. This means, on the other hand, that supply, service and sales companies by comparison had 6,670 employees on their payroll. These figures illustrate the momentum that exists in the Austrian biotechnology and pharma sector. The following chapters will shed a more specific light on the developments in the different parts of this sector.

	2012	2014	2017	2020
Number of companies in the biotechnology and pharma sector	288	336	363	405
Research, development, manufacturing companies*	157	175	207	235
Other companies**	131	161	156	170
Number of employees in the biotechnology and pharma sector	25,190	26,500	28,850	32,020
Employees in research, development, manufacturing companies*	18,057	18,480	23,080	25,350
Employees in other companies**	7,133	8,020	5,770	6,670
Turnover in the biotechnology and pharma sector	EUR 10.33 bn	EUR 11.65 bn	EUR 13.97 bn	EUR 16.03 bn
Turnover of research, development, manufacturing companies*	EUR 5.11 bn	EUR 5.72 bn	EUR 9.34 bn	EUR 11.14 bn
Turnover of other companies**	EUR 5.22 bn	EUR 5.93 bn	EUR 4.63 bn	EUR 4.89 bn

* dedicated, other biotechnology active, pharma companies

** suppliers, service providers, sales companies

Table 2: Key figures for the biotechnology and pharma sector 2012, 2014, 2017, 2020

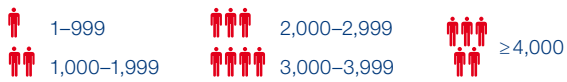
Map of the Biotechnology and Pharma Sector

Distributed According to Federal States

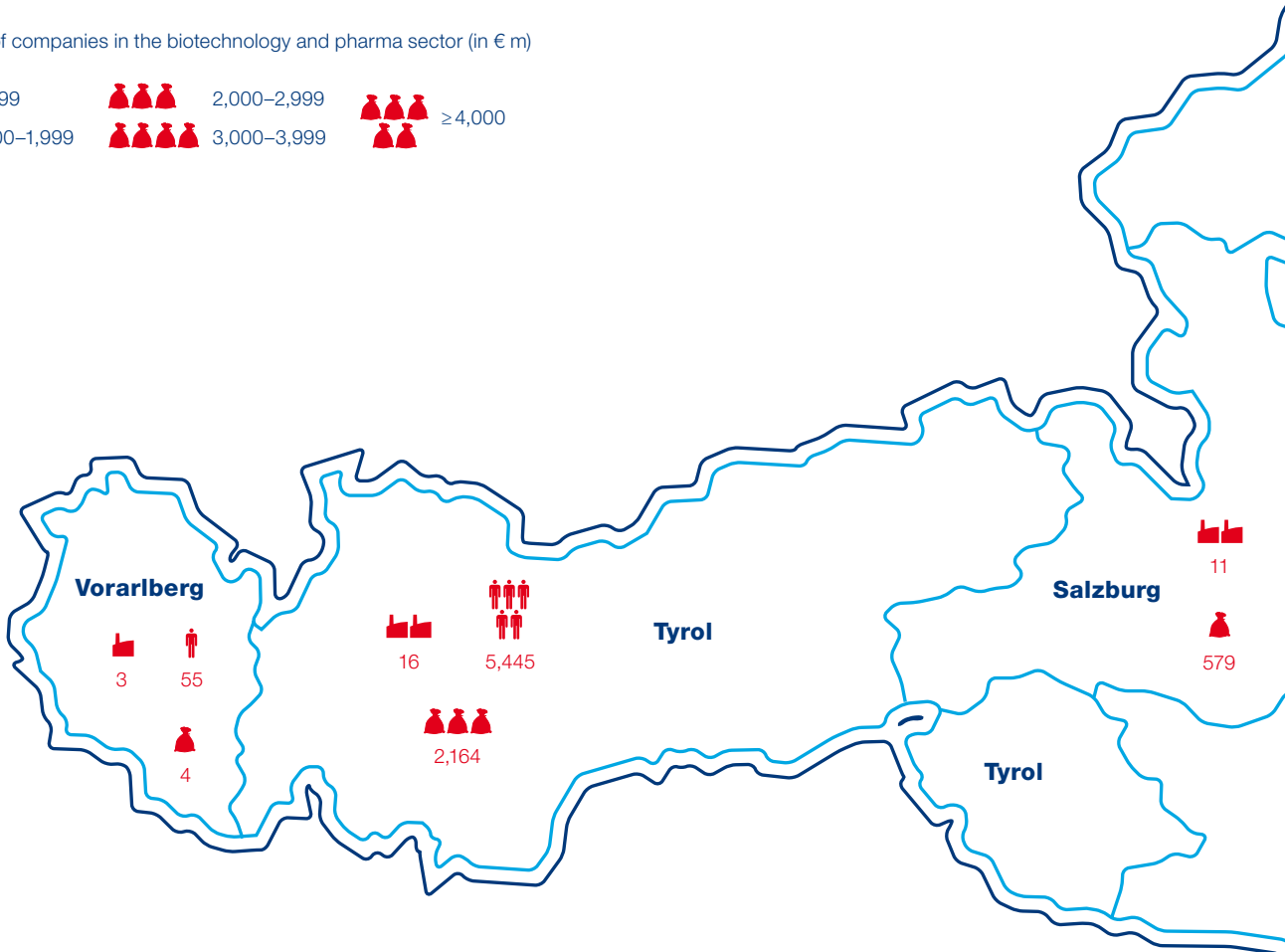
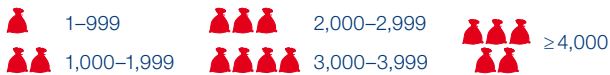
Number of companies in the biotechnology and pharma sector

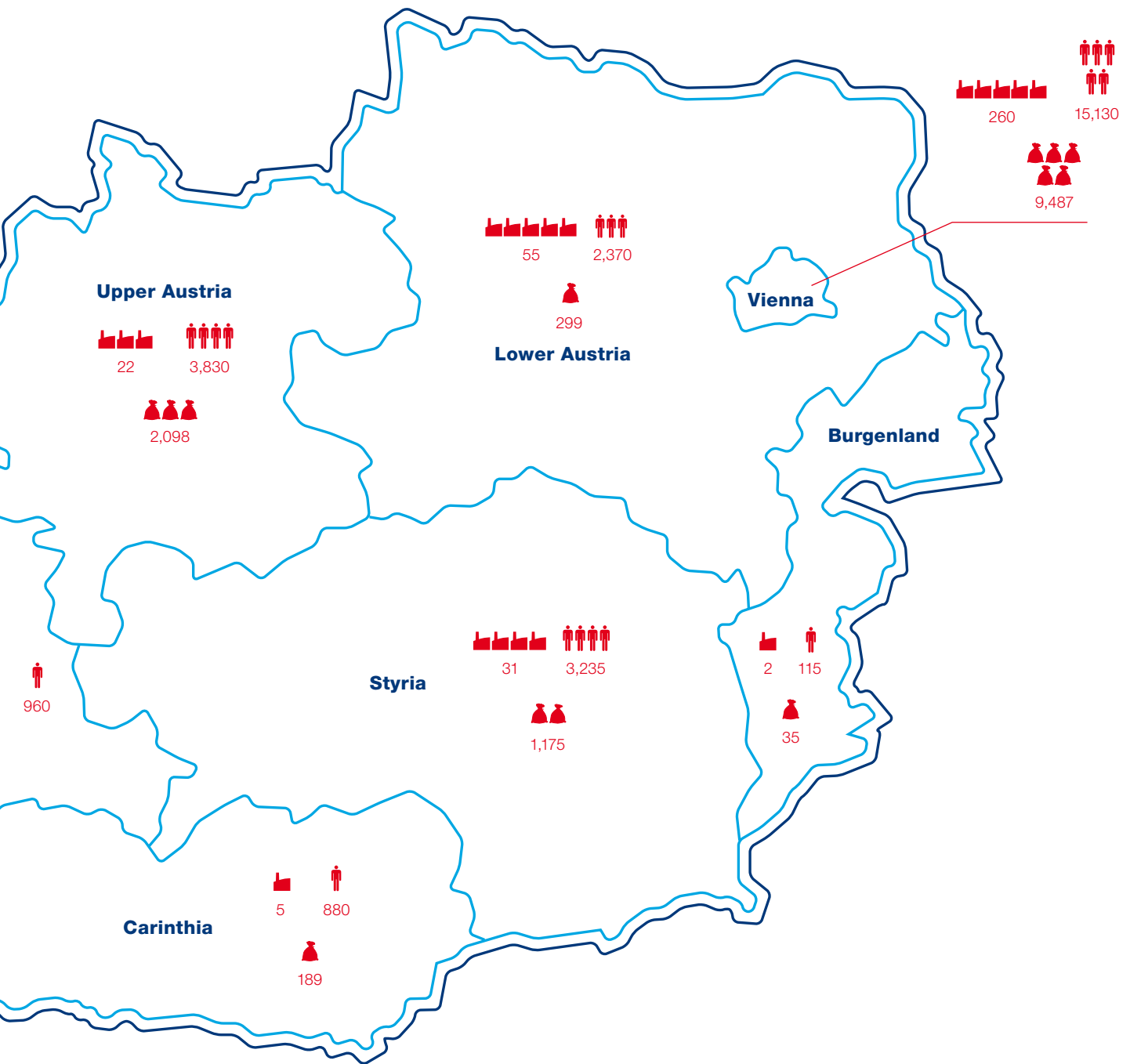


Number of employees in the biotechnology and pharma sector



Turnover of companies in the biotechnology and pharma sector (in € m)





2.1 Dedicated Biotechnology Companies Structure and Employees

Austria's biotechnology sector continues to thrive in recent years. Most of the key economic figures spanning from company and employee numbers to turnover remarkably improved from 2017 until 2020. This demonstrates a growing maturity of the sector.

In 2020, there were 151 Austrian companies occupied wholly, or for the most part, with biotechnology. They were counted as 'dedicated' biotechnology companies according to the definition (see page 47) of the Organization for Economic Cooperation and Development (OECD) with a predominant activity in biotechnology. This is a substantial increase (+18.9%) to the last survey in 2017. Compared to 2012, when there were only 95 dedicated biotech companies in Austria, the number has increased by almost two thirds.

Thirty-one start-ups sprung up since 2017; eight became operative in 2018, thirteen in 2019 and ten in 2020. On the other hand, a number of companies became insolvent within the last three years, and some firms either closed down or were acquired.

The Austrian biotech sector can be considered quite young. On average, a dedicated biotechnology company is just nine years old. For comparison: only eleven companies, representing seven percent, were set up before 2000. This illustrates the dynamic of the sector in the last few years.

A young and agile sector

Along with the number of companies, the number of employees has grown. In 2020, a total of 2,300 employees worked for dedicated biotechnology companies. This is 25.7% more than in 2017 (1,830 employees) and continues the upward trend (2014: 1,660 employees; 2012: 1,565 employees).

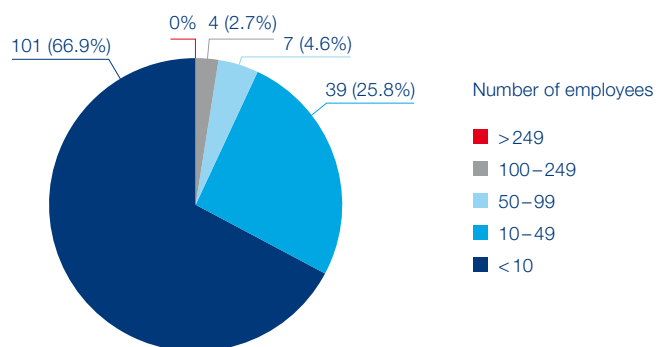


Figure 1: Size structure of dedicated biotechnology companies in 2020

The size of the companies reflects the sector's youth. Most of the Austrian biotech firms are small. None of the dedicated biotech companies included in this survey can be considered a large-scale enterprise according to EU definitions, i. e. having more than 250 employees. Instead, they fall into the category of small and medium-sized enterprises (SMEs).

Very small companies shape the field. Two thirds of the Austrian dedicated biotechnology companies (101 firms; 66.9%) have less than ten staff. In 2017, the share of very small companies was identically: The 84 companies and 66.9% of dedicated biotechs had a maximum of ten employees.

More than one quarter belongs to the second smallest company size: 39 companies have between ten and 49 persons on their payroll (25.8%). Larger dedicated biotechnology companies are the exception in Austria. To date, eleven firms have reached this size. Seven companies employ a staff of 50 to 99 (4.6%), four more have 100 to 249 employees on its payroll (2.7%).

	2012	2014	2017	2020
Number of dedicated biotechnology companies	95	116	127	151
Number of employees in dedicated biotechnology companies	1,565	1,660	1,830	2,300
Turnover of dedicated biotechnology companies	EUR 187.2m	EUR 198m	EUR 312.6 m	EUR 416.1 m
R&D expenditure of dedicated biotechnology companies	EUR 131.8m	EUR 143.6m	EUR 170.8 m	EUR 289.9 m
Financing of dedicated biotechnology companies	EUR 98.1 m	EUR 86.8m	EUR 289.5 m	EUR 313.2 m

Table 3: Key figures for dedicated biotechnology companies 2012, 2014, 2017, 2020

2.1 Dedicated Biotechnology Companies

Fields of Activity

Biotechnology is a typical cross-sectional technology. It is used in a wide range of applications and many different kinds of industry. Aimed at bringing some order into the field, five major branches are differentiated for dedicated biotechnology companies.

Medical biotechnology most important

Biotechnology companies in the area of health and medicine develop new treatments, vaccines, biomarkers or aim to find new diagnostics. Globally, health care represents the most important area of biotechnology applications, and this also holds true for Austria. In 2020, 102 of the 151 dedicated biotech companies (67.6%) in the country operated in this field, focussing on a wide range of different indications (see table 5, page 19). Companies in the field of industrial biotechnology are dedicated to the development of new technical enzymes, new biomaterials and new biotechnological production processes. In 2020, 15 Austrian companies (9.9%) were active in this field (2017: 14 companies), but this figure does not do justice to the sector's true significance. Since industrial biotechnology is primarily relevant for industry, a large number of activities do not take place in dedicated biotechnology companies, but rather in other biotechnologically active large-scale enterprises (see figure 5, page 22).

Bioinformatics – collecting and analyzing big data using information technologies – is a growing field. In 2020, seven

Austrian firms (4.6%) belonged to this category – up from five companies in 2017.

Companies in the agricultural biotechnology business aim at developing new biotechnological procedures to improve the plant health and yield of crops and ornamental plants, as well as algae. In 2020, four Austrian companies (2.7%) were active in this field, one more than in the previous years.

Some companies provide non-specific research technologies, reagents and equipment for other biotechnology or pharma firms. These businesses are counted as 'non-specific applications', but a large part of the services on offer are related to research and development activities in the healthcare sector. Pure contract research or manufacturing without own in-house development activities is also attributed to this category. With 23 companies (15.2%) in 2020, it is still the second largest segment of the Austrian biotechnology sector. The number of companies providing non-specific applications has raised by 15% since 2017 (20 companies).

Reflecting the sector as a whole, the majority of the start-up companies which became active since 2017 have focused their business models on health-related biotechnology (21 companies). Non-specific applications (5 companies), bioinformatics (3 companies), industrial biotechnology (1 company) and agricultural biotechnology (1 company) have played a minor but notable role.

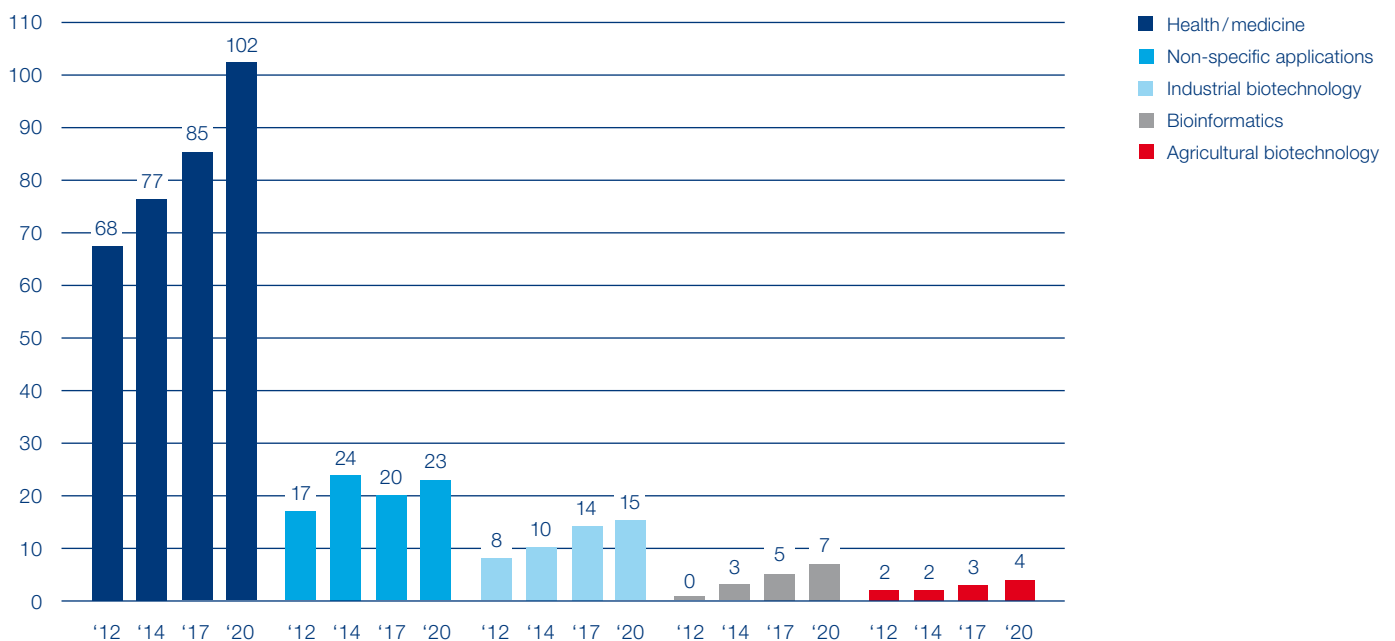


Figure 2: Main areas of activity in dedicated biotechnology companies 2012, 2014, 2017, 2020

2.1 Dedicated Biotechnology Companies

Clinical Pipeline and Indications

The clinical pipeline of drug candidates is the yardstick against which the success of a biopharmaceutical company is measured. The number and quality of the compounds found there is of the utmost importance: With a promising pipeline, it is easier to attract additional funding and new investors. Especially if the products in development are likely to reach market and to ameliorate as yet unmet medical needs.

In this analysis, compounds were only counted once, even if they were in clinical development for more than one indication or if approvals had been sought in more than one market.

Clinical pipeline progressing cautiously

The process of drug development is usually long and arduous and trends are slow to emerge. Long-term, there has been growth in health related research: In 2020, the 102 Austrian dedicated biotechnology companies had a total of 103 compounds in preclinical development, or in one of the three phases of clinical development. In 2017, 85 companies focused on 92 hopefuls and in 2014, 77 firms had 97 candidates in the pipeline. The number of drug candidates approved or close to approval increased from four in 2017 to seven candidates in 2020.

However, the number of biopharmaceutical substances has increased. In 2020, there were 86 such compounds in the pipeline (2017: 67), making up more than four-fifths of

all drug candidates. Only 17 drugs were small molecules (2017: 25). The majority of drug candidates are in the preclinical phase, i.e. the drugs are tested in the laboratory and not yet in humans: In 2020, a total of 51 biopharmaceutical candidates and 13 small molecules were in this early development stage. Thirty-five biotherapeutic agents and four small molecules have reached the more advanced stages of drug development and are being tested in humans. The number of approved products developed by Austrian dedicated biotech companies has gone up by one. There are now five products on the market. This number is likely to change soon, as there are currently two biotherapeutic products in the approval process.

Biopharmaceutical development projects matured

Over the years, the pipeline has constantly matured. In 2020, a total of 14 compounds were tested in clinical phase I trials (all of them being biomolecular agents). Twenty-one additional drug candidates were in phase II, of which 17 were biotherapeutic agents. Four biopharmaceutical drug candidates and no small molecule compound reached the final phase III. Austrian dedicated biotechnology companies focus their drug development on several indications with high unmet medical needs. The International Statistical Classification of Diseases and Related Health Problems (ICD-10) is used to group the development programmes. Several main categories can be distinguished depending on which organ is affected by a disease and on the drug candidate's site of action.

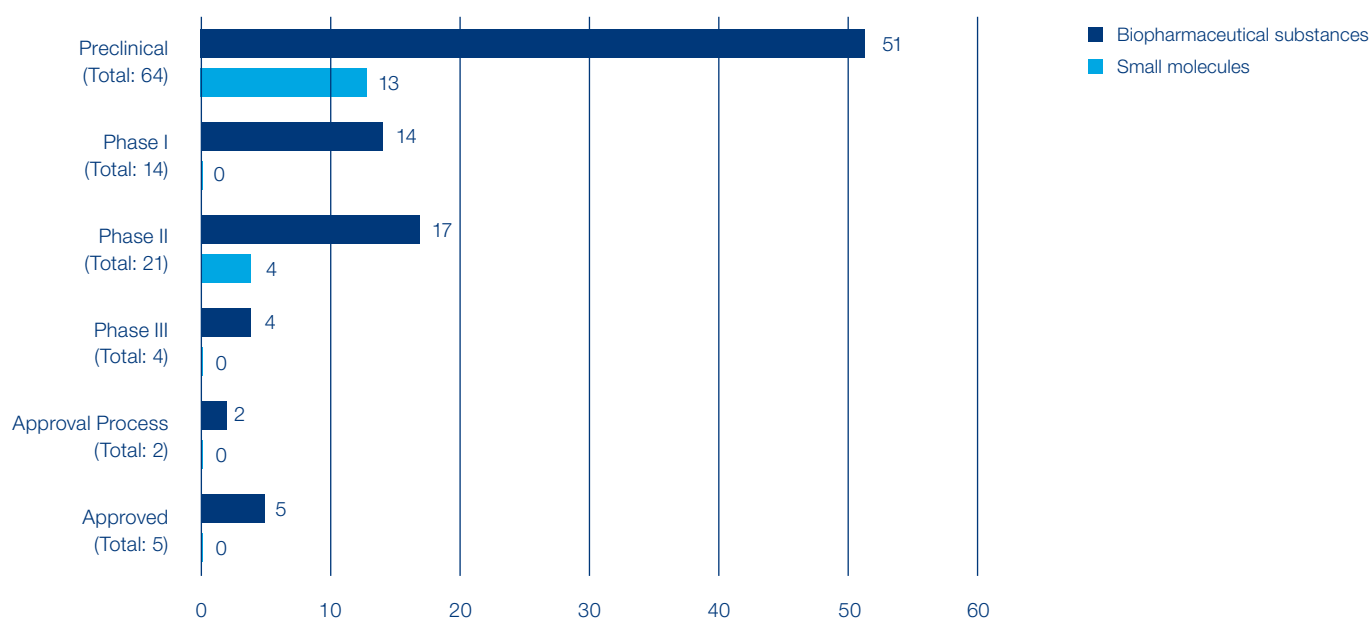


Figure 3: Drug candidates of dedicated biotechnology companies in 2020

Company	Drug candidate	Indication
Phase I		
AFFIRIS AG	PD01	Parkinson's disease
Apeiron Biologics AG	APN401	Various tumors
BlueSky Immunotherapies	delNS1/E6E7	Cervical carcinoma
EveliQure Biotechnologies GmbH	ShigETEC	Shigella and enterotoxigenic E. coli
F-star Biotechnologische Forschungs- und Entwicklungs GmbH	FS222	Various tumors
	FS120	Various tumors
	SB11285	Various tumors
Hookipa Biotech	HB-201	Human papillomavirus (HPV) 16 induced cancer
	HB-202/201	Human papillomavirus (HPV) 16 induced cancer
Recardio	REC-02	Congestive heart failure
Themis Bioscience GmbH	MV-ZIKA	Zika virus
	MV-LASV	Lassa virus
	TMV-018	Gastrointestinal cancer
Valneva Austria GmbH	VLA1601	Zika virus
Phase II		
Apeiron Biologics AG	APN01	Acute respiratory distress syndrome
	APN301	Neoblastoma
Aposcience AG	APO-2	Diabetic foot ulcers
Biomay AG	BM32	Grass pollen allergy
Biomedizinische Forschungsgesellschaft m.b.H.	rTSST-1v	Toxic shock syndrome
EURRUS Biotech GmbH	XC-8	Asthma
F-star Biotechnologische Forschungs- und Entwicklungs GmbH	FS118	Various tumors
F2G Biotech GmbH	F901318/Olorofim	Invasive fungal infections
F4 Pharma	FX06	Acute respiratory distress syndrome
Hookipa Biotech	HB-101	Cytomegalovirus (CMV)

Table 4: Drug candidates of dedicated biotechnology companies in clinical phase I till approval in 2020

Company	Drug candidate	Indication
Phase II		
Innovacell Biotechnologie AG	ICEF15	Faecal incontinence
Themis Bioscience GmbH	MV-CHIK	Chikungunya virus
Marinomed Biotechnologie GmbH	Marinosolv/Flutisolv	Allergic rhinitis
	Marinosolv/Tacrosolv	Allergic rhinitis
Panoptes Pharma Ges. m.b.H.	PP-001	Uveitis
Recardio	REC-01	Acute myocardial infarction
Valneva Austria GmbH	VLA15	Lyme disease
	VLA84	Clostridium difficile
Viravaxx AG	VXX001	Hepatitis B
Vivaldi Biosciences AG	deltaFLU	Seasonal and pandemic influenza
Zytoprotec GmbH	PD-protec	Peritoneal dialysis
Phase III		
APEPTICO Forschung und Entwicklung GmbH	Solnatide (AP301)	Acute respiratory distress syndrome
Innovacell Biotechnologie AG	ICES13	Stress urinary incontinence
Valneva Austria GmbH	VLA2001	COVID-19
	VLA1553	Chikungunya virus
Approval Process		
Marinomed Biotechnologie GmbH	Marinosolv/Budesolv	Allergic rhinitis
NABRIVA Therapeutics AG	Fosfomicin	Bacterial infections (urinary tract infection)
Approved		
Apeiron Biologics AG	Qarziba	High-risk neuroblastoma
Marinomed Biotechnologie GmbH	Carragelose	Common cold and flu-like illness
NABRIVA Therapeutics AG	Lefamulin (BC-3781)	Bacterial infections (community-acquired bacterial pneumonia)
Valneva Austria GmbH	IXIARO	Japanese encephalitis
	DUKORAL	Cholera

Table 4: Drug candidates of dedicated biotechnology companies in clinical phase I till approval in 2020

Drugs for the treatment of infectious or parasitic diseases play the biggest role. Thirty-three companies (32.4%) had ongoing development programs in this indication in 2020. Antiinfectives were of particular interest to start-ups: five of the newcomers develop agents to fight infectious and parasitic diseases.

The second important group are companies with a focus on cancer treatments. A total of 23 companies (22.5%) reported working in the neoplasms field. This indication has also attracted newly founded businesses, for example in the booming field of immuno-oncology. Compounds for the treatment of respiratory system diseases are in the pipeline of 19 Austrian biotechs (18.6%). According to the ICD-10 classification scheme, many anti-allergy drugs are classified as treatments for diseases of the respiratory system. Seventeen companies (16.7%) are developing drugs

against diseases of the skin and subcutaneous tissue. Another large number of companies concentrate on endocrine, nutritional and metabolic diseases. Sixteen companies (15.7%) have initiated clinical programs in this indication. Other relevant areas of research include diseases of the blood and immune system (15 companies, 14.7%), diseases of the nervous system (11 companies, 10.8%), diseases of the musculoskeletal system and connective tissue (10 companies, 9.8%), diseases of the digestive system, diseases of the genitourinary system and diseases of the circulatory system (9 companies each, 8.8%). In 2020, five Austrian dedicated biotechnology companies (4.9%) had active ingredients under development for the treatment of diseases of eye and adnexa. One company (1%) worked on cures for mental and behavioural disorders and another company (1%) worked on diseases of the ear and the mastoid process.

Indications according to ICD-10	Number of companies	Percentage
Certain infectious and parasitic diseases	33	32.4%
Neoplasms	23	22.5%
Diseases of the respiratory system	19	18.6%
Diseases of the skin and subcutaneous tissue	17	16.7%
Endocrine, nutritional and metabolic diseases	16	15.7%
Diseases of the blood and immune system	15	14.7%
Diseases of the nervous system	11	10.8%
Diseases of the musculoskeletal system and connective tissue	10	9.8%
Diseases of the digestive system	9	8.8%
Diseases of the genitourinary system	9	8.8%
Diseases of the circulatory system	9	8.8%
Diseases of the eye and the adnexa	5	4.9%
Mental and behavioural disorders	1	1.0%
Diseases of the ear and the mastoid process	1	1.0%
Pregnancy, childbirth and the puerperium	0	0.0%

Table 5: Overview of indications in the focus of medical biotechnology companies in 2020

2.1 Dedicated Biotechnology Companies

Turnover, R&D Expenditure and Financing

With the increasing number of dedicated biotechnology companies in Austria comes significant growth of the sector. Above all, this is demonstrated in terms of turnover. In 2020, the 151 Austrian dedicated biotechnology companies had a combined revenue of 416.1 million euros, which means a plus of one third (33.1%) when compared to 2017 (312.6 million euros).

Biotechnology turnover in the health sector more than 270 million euros

The most significant growth has taken place in the health-related areas of biotechnology. With 270.1 million euros, turnover of these companies increased by 32.7% compared to 2017 (203.6 million euros). The young sector can already boast five products on the market and a well-filled pipeline that is attracting licence deals and the like. Although not quite as impressive, industrial biotechnology also recorded a decent increase. With revenues of around 40.7 million euros in 2020, the figures increased by 16.3% compared to 2017 (35 million euros), reflecting a growing importance of biotechnological solutions for industrial processes. Only a small proportion of turnover in Austria is contributed by companies in agricultural biotechnology.

Aside from the three fields of medicine, industry and agriculture, there is also a range of companies offering non-

specific research applications and services. In 2020, these companies generated revenues of around 100.8 million euros, accounting for 24.2% of total turnover among the dedicated biotechnology companies. Compared to 2017, when the companies generated 71.4 million euros of turnover, the figure increased by 41.2%.

High amount of turnover invested in R&D activities

An important indicator for the innovative power and the sustainability of an industry sector is the amount of money invested into research and development (R&D). More than most other industries, biotechnology is highly research-intensive. Companies often have to spend millions of euros in R&D before they can bring a product to market. This is highlighted by the 289.9 million euros – more than two thirds of turnover (69.7%) – invested in R&D by dedicated companies in 2020. R&D expenditure has experienced significant growth and has reached a new record.

Given the high costs associated with the development of new drugs, the largest sums by far are invested in health-related projects. In 2020, this area alone accounted for 231.5 million euros of R&D spending (2017: 156.1 million euros). More than 80% of turnover was reinvested into R&D in this segment. Firms focussing on non-specific activities have also experienced significant reinvestments with an R&D budget of about 53.5 million euros (2017: 8.5 million euros). Industrial biotechnology companies invested 3.7 million euros in R&D projects (2017: 5.5 million euros).

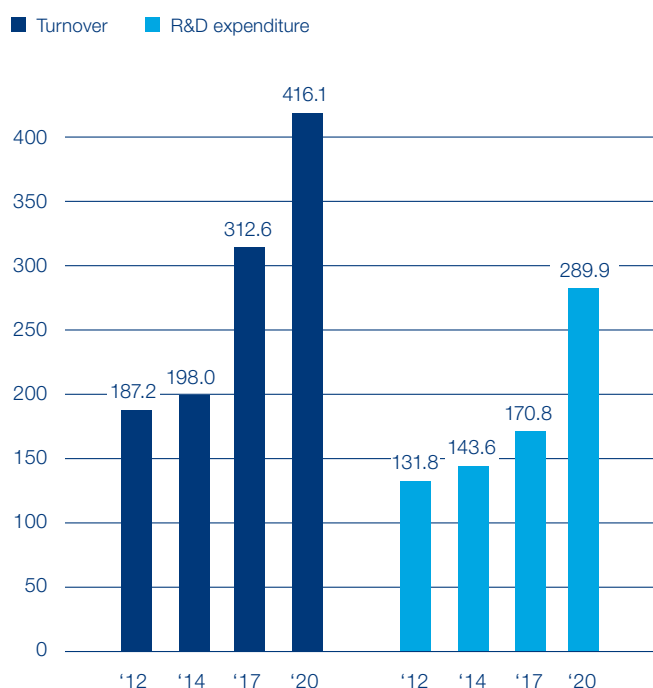


Figure 4: Turnover and R&D expenditure (both in € m) of dedicated biotech companies 2012, 2014, 2017, 2020

Financing of biotech companies solely relies on VC investors and stock markets

Given the large amounts of capital needed for research and development of biotechnological products, this sector has a high demand for external financing: either through venture capital, institutional or private investors, public subsidies, loans or other contributions. However, most Austrian companies are not obliged to report all their financing proceedings. Thus, statistics in this area may remain somewhat incomplete. In addition, capital markets are a highly dynamic field, being dependent on both the overall financial environment, and the performance of individual companies. In terms of financing, 2020 was an outstandingly good year for Austrian dedicated biotechnology companies. They managed to secure a total of 313.2 million euros. This is an increase of 8.2% compared to 2017 (289.5 million euros). Financings through venture capital and stock markets make up almost two thirds of attracted funding. In 2020, Austrian biotechs were able to raise 197.6 million euros this way.

2.1 Dedicated Biotechnology Companies

Comparison between Austria and Germany

Biotechnology is considered an important strategic field for future development and investment in most industrialized countries. This is demonstrated by key statistical numbers, which are regularly collected by the Organisation for Economic Co-operation and Development (OECD). Since 2003, all OECD countries have been called upon to carry out surveys on biotechnology, following the so-called Framework for Biotechnology Statistics. However, in the respective member states, the biotechnology definitions are interpreted differently, which leads to a distortion of results. In addition, the most recent comparable key facts date back to 2012.

Within Central Europe, comparable statistics are consistently available for Germany. Here, annual surveys are conducted based on the same criteria as in Austria. In this overview, the development of Austria's biotech sector in the years 2012, 2014, 2017 and 2020 is analyzed with regard to the key results of the national German biotech statistics of the respective years (see table 6). The dedicated biotechnology companies and their development are the focus here.

Improved financial environment

The data clearly show an ongoing economic upswing for both countries. The financial key figures have been improving over the last few years, continuing the trend since 2012. A more detailed comparison of the growth rates in the two neighboring countries reveals that, despite being smaller and with a younger biotech sector, Austria is well able to compete with the economically larger and more mature biotech sector in Germany. While Germany has the greater increase in turnover and R&D expenditure, the Austrian sector can boast the larger growth in number of companies and employees for the last three years.

While the German biotech sector recorded high growth rates of over 35% between 2014 and 2017 and an outstanding plus of 63% between 2017 and 2020, both the number of companies and the number of employees increased between 2017 and 2020 considerably as well (a plus of 13.9% and 24.4%, respectively). In comparison, the number of biotech companies in Austria grew even more by 18.9%, and, remarkably, the number of employees by 25.7%. Regarding turnover and R&D expenditure, the data paint a different picture. German dedicated biotechnology companies made 63.4% more revenue in 2020 than in 2017, and they clearly top the 32.9% growth of their Austrian counterparts.

Commitment to research & development

Strong commitment to research has long been a particular strength of the Austrian biotech sector. In 2020, the companies spent 32.6 euros per capita on research and development (up from 19.5 euros per capita in 2017); in Germany, this figure is 25.8 euros (2017: 13.5 euros). In total, Austrian biotechs spent 171 million euros on R&D, which is an enormous increase of 69.6%. If the total number of dedicated biotech companies active in the medical sector is set into correlation with the total number of clinical candidates, then the Austrian companies also show a slightly higher activity. In 2020, 23% of the Austrian and 20% of the German medical biotechnology firms had at least one candidate in the clinical development phase or already on the market. The numbers show that Austria, although much smaller than its neighbor, can still hold its own when it comes to economic growth in the biotechnology sector.

	2012		2014		2017		2020	
	Germany*	Austria	Germany*	Austria	Germany*	Austria	Germany*	Austria
Number of companies	565	95	579	116	646	127	736	151
Number of employees	17,430	1,565	17,930	1,660	21,860	1,830	27,200	2,300
Turnover	EUR 2,903 m	EUR 187 m	EUR 3,032 m	EUR 198 m	EUR 4,105 m	EUR 313 m	EUR 6,708 m	EUR 416 m
R&D expenditure	EUR 934 m	EUR 132 m	EUR 954 m	EUR 144 m	EUR 1,117 m	EUR 171 m	EUR 2,140 m	EUR 290 m

Table 6: Key figures for German and Austrian dedicated biotech companies 2012, 2014, 2017, 2020

* 'The German Biotechnology Sector' (2012, 2014, 2017, 2020); BIOCOM AG

2.2 Other Biotechnology Active Companies

Structure, Employees, Fields of Activity and Turnover

Austria is home to a wide range of companies with activities that are not dedicated exclusively to biotechnology. Other biotechnology active companies include those with less than 70% biotechnology-related businesses. Again, the health sector covers the vast majority of other biotechnology active companies: 65.3% of the companies have significant activities in this sector. Another 18.4% have pursuits in the industrial biotechnology area, and each 8.2% in agricultural biotechnology and non-specific applications.

Notable increase partly due to methodology change three years ago

In 2020, there were 49 companies in Austria that count biotechnological activities as an aspect of their business, four more than in 2017. The strong increase in this area, which already took place in 2017, can be partly explained by a change in methodology. Companies that had been classified as “sales and distribution companies” in previous years were assigned to “other biotechnology active companies” in 2017. These companies conduct clinical studies but are otherwise mainly active in sales (see methodology on page 45 ff.).

Big companies build the industry

The 49 companies employed in total 18,870 people, up from 17,650 employees in 2017. This represents a plus of 7%. Total workforce primarily concerned with biotechnology in the companies rose from 7,100 employees in 2017 to 7,660 employees in 2020, representing 41% of the total staff. In contrast to the dedicated biotech sector, this segment is dominated by big employers: there were twelve companies that have more than 249 employees on their books (24.5%), and another 15 that have more than 100 employees (30.6%). In addition, there were eight medium-sized companies (50–99 employees; 16.3%) and

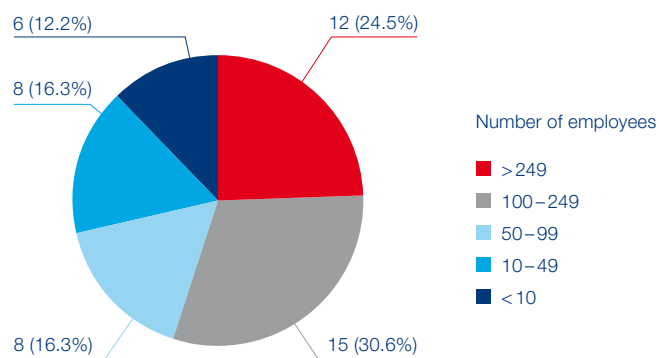


Figure 5: Size structure of other biotechnology active companies in 2020

eight companies with less than 50 employees. Only six companies (12.2%) had less than ten staff.

Turnover increased

The turnover of companies active in the category described here has doubled since 2014. Other biotechnology active companies generated a turnover of 8.7 billion euros – an increase of 13.8% when compared to 2017 (7.6 billion euros). Altogether, company numbers, staff numbers and turnover increased slightly.

Naturally, other biotechnology active companies only generate parts of their turnover with biotechnology-related areas. However, the figures illustrate the growing relevance of these companies for Austria from an economic perspective. Parallel to the turnover, investments into research and development also increased notably. In 2020, Austria-based companies in the category “other biotechnology active” invested 837 million euros into R&D activities – 6.9% more than in 2017, when R&D expenditure reached 783 million euros.

	2012	2014	2017	2020
Number of other biotechnology active companies	33	27	45*	49
Number of employees in other biotechnology active companies	13,790	13,720	17,650*	18,870
Number of employees in the biotech-related areas of other biotechnology active companies	5,890	5,970	7,100*	7,660
Turnover of other biotechnology active companies	EUR 3.88bn	EUR 4.43bn	EUR 7.59bn*	EUR 8.64bn
R&D expenditure of other biotechnology active companies	n.a.	EUR 534 m	EUR 783m*	EUR 837 m

Table 7: Key figures for other biotechnology active companies 2012, 2014, 2017, 2020

* partly also due to change in methodology

2.3 Pharma Companies

Structure, Employees, Fields of Activity and Turnover

From diagnostics to medicines: Pharma companies discover, develop and produce drugs – both chemically synthesized molecules and natural compounds derived from plants or animals for human or veterinary use. However, only firms that do not have any biotechnological activities are included in the category “Pharma Companies”. Those that do are included in section 2.2 “Other Biotechnology Active Companies”.

For pharma companies, a change in methodology contributed to the increase in numbers in 2017. Then, four companies that engage in clinical research were reassigned from “sales” to “pharma” company (see methodology on page 47).

Small-sized firms shape the industry

In 2020, 35 companies were active in the pharma sector in Austria as it was in 2017. Typically, most of them are small. There are eleven companies with less than ten staff, and another eleven firms with up to 50 employees (31.4% each). Two companies have up to 100 employees (5.7%)

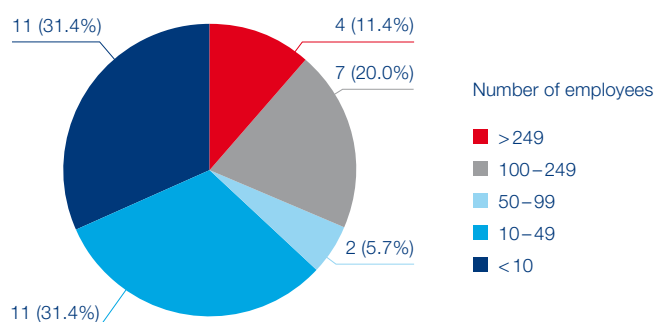


Figure 6: Size structure of pharma companies in 2020

and seven more are medium-sized, with up to 250 employees (20%). Four companies have more than 249 people on their payroll and thus belong to the category of big companies (11.4%). In total, the 35 pharma companies provided jobs for 4,180 employees, a plus of 16% compared to 2017 (3,600 employees).

Solid growth in turnover and R&D expenditure

The pharma companies in Austria proved to be an important economic factor. In 2020, they achieved a turnover of 2.08 billion euros, which represents a substantial increase of 45% compared to 2017 (1.43 billion euros). Given the fact that the methodology did not change within the last three years, pharma companies are thriving: both numbers of employees and turnover increased remarkably.

Expenditure on research and development also rose, although not quite as much. Austrian pharma companies invested 142 million euros in R&D to keep their product pipeline filled. This represents a slight increase of 5% to the R&D expenditure in 2017 (135 million euros) and reflects the growing importance of investments in innovative drug development.

	2012	2014	2017	2020
Number of pharma companies	29	32	35*	35
Number of employees in pharma companies	2,700	3,100	3,600*	4,180
Turnover of pharma companies	EUR 1.03 bn	EUR 1.1 bn	EUR 1.43 bn*	EUR 2.08 bn
R&D expenditure of pharma companies	EUR 91.8m	EUR 110m	EUR 135m*	EUR 142m

Table 8: Key figures for pharma companies 2012, 2014, 2017, 2020

* partly also due to change in methodology

2.4 Suppliers in the Biotechnology and Pharma Sector

Structure, Employees, Fields of Activity and Turnover

Drug development followed by analysis and production is a highly complex process. The majority of biotechnology and pharma companies rely on efficient suppliers to divide the wide range of labor needed during the long route from bench to bedside. This is not only true for the group of companies that already has products on the market, but also applies to the research-based biotechnology or pharmaceutical businesses which also would not be able to operate without continuous support from suppliers.

A broadly diversified product portfolio

The field of activities within the suppliers sector is as manifold as the biotech and pharma sector itself. The product portfolio includes a huge variety of products, such as:

- bio-based pesticides and biocides used for plant protection
- bulk chemicals, specialties and reagents used for basic research
- complete laboratory kits used for diagnostic testing
- consumables and disposables
- enzymes and ready-to-use solutions, used for cell culture
- laboratory equipment
- large devices
- technical enzymes and microbes used for biotechnology-based industrial processes

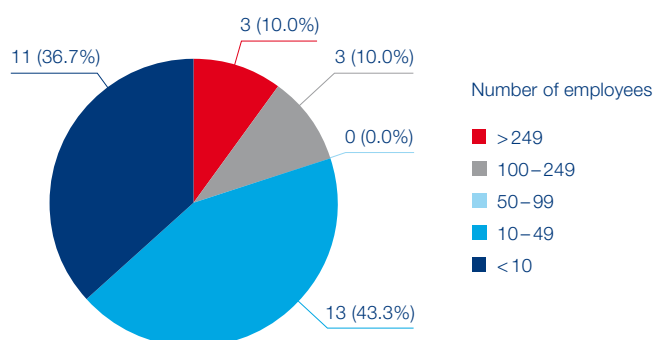


Figure 7: Size structure of suppliers in the biotechnology and pharma sector in 2020

All up, there are 30 companies in Austria dedicated to one of these business activities. Together, they achieved a turnover of 774 million euros in 2020. This represents a 16.2% jump in comparison to 2017, when a total of 26 suppliers recorded a turnover of 666 million euros. In comparison to 2012, the number of suppliers has more than doubled (2012: 14 companies), while turnover increased by 60.9% (2012: 481 million euros). On average, each company generates a turnover of 25.8 million euros.

Small, specialized suppliers dominate the field

A significant part of the biotechnology and pharma job market is related to the supply companies. Altogether, these firms employed a total of 2,430 staff in 2020 – up 30.6% from 2017, when 1,860 people were on suppliers' payroll, and up 36.5% compared to 1,780 employees in 2014.

Quite a number of small enterprises operate in this segment in Austria. Exactly 80% of all suppliers have no more than 50 employees. In more detail, 13 companies have more than ten but less than 50 staff, making it the most common business size for a supplier dedicated to serving the biotechnology and pharma sector. Larger suppliers are rare in Austria: Only three firms have more than 100 and another three more than 250 staff on their books.

	2012	2014	2017	2020
Number of suppliers in the biotechnology and pharma sector	14	24	26	30
Number of employees of suppliers in the biotechnology and pharma sector	1,370	1,780	1,860	2,430
Turnover of the suppliers in the biotechnology and pharma sector	EUR 481 m	EUR 604 m	EUR 666 m	EUR 774 m

Table 9: Key figures for suppliers in the biotechnology and pharma sector 2012, 2014, 2017, 2020

2.5 Service Providers in the Biotechnology and Pharma Sector

Structure, Employees, Fields of Activity and Turnover

A plethora of biotechnology and pharmaceutical companies have to rely on service providers to do work that is not part of their core business. The tasks for service providers vary widely and depend on the current customers' needs.

Leading clinical research or manufacturing

One of the biggest markets in this sector is served by clinical research organizations (CROs), which support the firms during clinical research. Service providers active in this field help biotech and pharma companies to closely follow guidelines as defined in Good Clinical Practice (GCP). Another important activity is related to technical requirements in the production of drugs where there is the need to strictly adhere to particular aspects of the regulations regarding Good Manufacturing Practices (GMP). This requires not only extensive technical knowledge but also comprehensive documentation, qualification and validation of all processes according to current GMP regulations. A significant proportion of Austrian service providers plan the process management for complex chemical or biotechnological production chains. Further services relate to the management and statistical analysis of data which is generated by extensive clinical trials, or affects special analytical competences needed in the biotechnology and pharma sector.

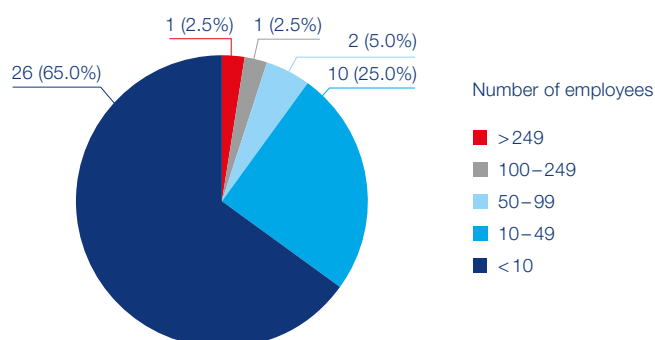


Figure 8: Size structure of service providers in the biotechnology and pharma sector in 2020

Service providers active in the Austrian biotech and pharma sector are still a small segment. However, today they are more established than three years ago. In 2020, there were 40 firms, two more than in 2017 (38 companies). In 2020, 760 persons were working in this segment – an increase of 10% compared to 2017 (690). The number of service providers has grown considerably. Notably, their turnover has reached a new peak in 2020, where 118 million euros were generated by these companies, an increase of 18% compared to 2017 (100 million euros). This change can be attributed to the establishment of a single large entity in which more than 250 people were employed.

Small firms dominate the field

Most companies providing services for the biotech and pharmaceutical industry are small. Twenty-six companies (65.0%) only employ up to nine staff. The ten next largest companies (25.0%) operate with a staff of more than ten but less than 50. There are two companies with less than 100 employees in the service sector, and one firm that has more than 100 but less than 250 members of staff. As mentioned above, there is only one large-scale enterprise with more than 250 employees among the service providers.

	2012	2014	2017	2020
Number of service providers in the biotechnology and pharma sector	14	26	38	40
Number of employees of service providers in the biotechnology and pharma sector	783	870	690	760
Turnover of the service providers in the biotechnology and pharma sector	EUR 95m	EUR 103m	EUR 100m	EUR 118m

Table 10: Key figures for service providers in the biotechnology and pharma sector 2012, 2014, 2017, 2020

2.6 Sales and Distribution Companies in the Biotechnology and Pharma Sector

Structure, Employees and Turnover

Sales and distribution play critical roles within companies which have succeeded in developing a product for the market – this is especially true for the pharma business. If a company is focused exclusively on distributing goods and it has no other division – such as research and development or production for instance – it is considered to be a sales and distribution company within the scope of this study.

In a change of methodology in 2017, companies involved with clinical studies are no longer listed in this section. Almost two dozen companies that were categorized as “sales and distribution” have thus been reassigned to other segments three years ago. For detailed information, please see methodology, page 47.

Austria, the gateway to Europe

Due to its unique geographical location in the center of Europe, Austria possesses an ideal location for sales and distribution. Therefore, several globally active pharma or biotechnology companies have established sales and distribution subsidiaries in Austria. The offices based in Austria are often used to penetrate not only the national market itself, but also other European countries or even Europe as a whole. Austria’s unique history and well-established infrastructure makes it a particularly suitable gateway to countries in Central and Eastern Europe (CEE).

In 2020, there were a total of 100 sales and distribution offices specialized in biotechnology and pharma operating across Austria. Compared to 2017, the numbers reveal an increase of almost 10% (92 companies). In total, 3,480 employees worked in this segment in 2020 and therefore increased by 8% (2017: 3,220 employees). Thus, with regard to the job market, the sales and distribution sector plays an important role in the biotech and pharma business.

The turnover of the 100 Austrian sales and distribution offices specialized in biotechnology and pharma aggregated to 4.00 billion euros, reflecting an increase of almost 5%. According to this, sales and distribution companies contribute significantly to the economic landscape.

Medical biotechnology and pharmaceuticals in focus

The specific fields of activity for sales and distribution companies are highly diversified, which is in general common for this sector. The range extends from fairly simple products – such as cough syrup, which has been based on the same recipe for decades – to very complex high-tech products, such as state-of-the-art cancer therapies composed of fully humanized multifunctional antibodies.

In addition to biopharmaceutical or chemically synthesized drugs, Austrian sales and distribution offices supply plant-based phytopharmaceuticals or homeopathic drugs as well as dietary supplements. Besides selling drugs intended for human use, some companies extend their focus to veterinary medicines. A reasonable number of companies focus on selling diagnostic products certified either as an in vitro diagnostic for human use (CE-IVD) or as a research-only tool.

The vast majority of companies that have subsidiaries for sales and distribution in Austria are active in the field of medical biotechnology and pharma. There are some companies, however, that are active in agriculture, instead. Some focus on the distribution of pesticides and biocides. The substances are used in farming to protect crops and ornamental plants from vermin, harmful fungi and other pests or to increase crop yield. Other compounds might increase the growth of livestock or protect the animals from disease.

	2014	2017	2020
Number of sales and distribution companies in the biotechnology and pharma sector	111	92*	100
Number of employees in sales and distribution companies in the biotechnology and pharma sector	5,370	3,220*	3,480
Turnover of sales and distribution companies in the biotechnology and pharma sector	EUR 5.22 bn	EUR 3.86bn*	EUR 4.00bn

Table 11: Key figures for sales and distribution companies in the biotechnology and pharma sector 2014, 2017, 2020

*partly also due to change in methodology

3. Medical Device Industry in Austria

Overview

Austria is among the top ten countries with the highest health expenditure as a share of the gross domestic product (GDP). According to the OECD Health Statistics 2021, Austria spent about 11.5% of its GDP in 2020 on health – and this number continues to grow. The medical device industry forms a cornerstone of the country’s health sector. With its cutting-edge technology, the companies in the field work at the interface between first-rate clinics, excellent research facilities and highly qualified doctors. Not only does this turn Austria into an attractive market for medical device products, it also makes it an important location for their development and production.

Ongoing upward trend

As a result of the demographic development caused by an aging population and the challenge to integrate novel developments such as digital health, the demand for new solutions is ever growing. Austria’s healthcare system is financed by a mix of income-dependent social security fees, tax-financed public funds and private payments. Innovations in the medical device field can rapidly find their way to the patient in one of the 264 public and private hospitals in the country. A CE marking (‘Communauté Européenne’) and compliance with the Medical Device Regulation (‘Medizinproduktegesetz’, formerly Medical Device Act) are required for the distribution of medical device products in Austria. With a constant stream of new developments, the medical device industry in Austria is an economic sector which contributes to the further advancement of healthcare. In spite of a remarkable number of long-established companies, the sector has seen tremendous growth in recent years – a trend that continued in 2020.

Turnover approaches the 10 billion mark

In 2020, there were a total of 577 companies active in the Austrian medical device industry. Compared to 2017, this marks an increase of almost 5%. As in the previous reports, the information collected on these companies was based on Global Medical Device Nomenclature (GMDN) guidelines.

Among the 577 companies in the medical device sector, there are 199 so-called ‘research, development or manufacturing medical device companies’ which are divided into the ‘dedicated medical device companies’ and the ‘other medical device companies’ (for methodology, see page 48). Compared to 171 such companies recorded in 2017, this is a significant increase of 16%. Another major part of the medical device business in Austria are suppliers, service providers and sales companies. Their number has slightly decreased since 2017: While there were 383 such companies in 2017, there were 378 in 2020.

With a workforce of 28,420 employees, the medical device industry is an increasingly important pillar in the Austrian job market. In 2020, the combined turnover of all companies in the field was at 9.03 billion euros – 7% more than in 2017. 2.92 billion euros of this was generated by the research, development or manufacturing companies, and 6.11 billion euros by the suppliers, service providers and sales companies. These numbers show a strong economic power of the medical device industry in Austria.

	2014	2017	2020
Number of companies in the medical device sector	487	554	577
Research, development, manufacturing companies*	132	171	199
Other companies (suppliers, service providers, sales companies)	355	383	378
Number of employees in companies related to medical device	25,160	26,630	28,420
Employees in research, development, manufacturing companies*	7,200	8,760	9,650
Employees in other companies (suppliers, service providers, sales companies)	17,960	17,870	18,770
Turnover of all companies related to medical device	EUR 7.46bn	EUR 8.44bn	EUR 9.03bn
Turnover of research, development, manufacturing companies*	EUR 2.32bn	EUR 2.69bn	EUR 2.92bn
Turnover of other companies (suppliers, service providers, sales companies)	EUR 5.14bn	EUR 5.75bn	EUR 6.11bn

Table 12: Key figures for the medical device sector 2014, 2017, 2020

* dedicated and other medical device companies

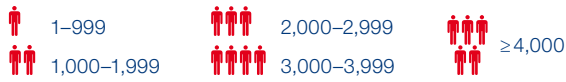
Map of the Medical Device Sector

Distributed According to Federal States

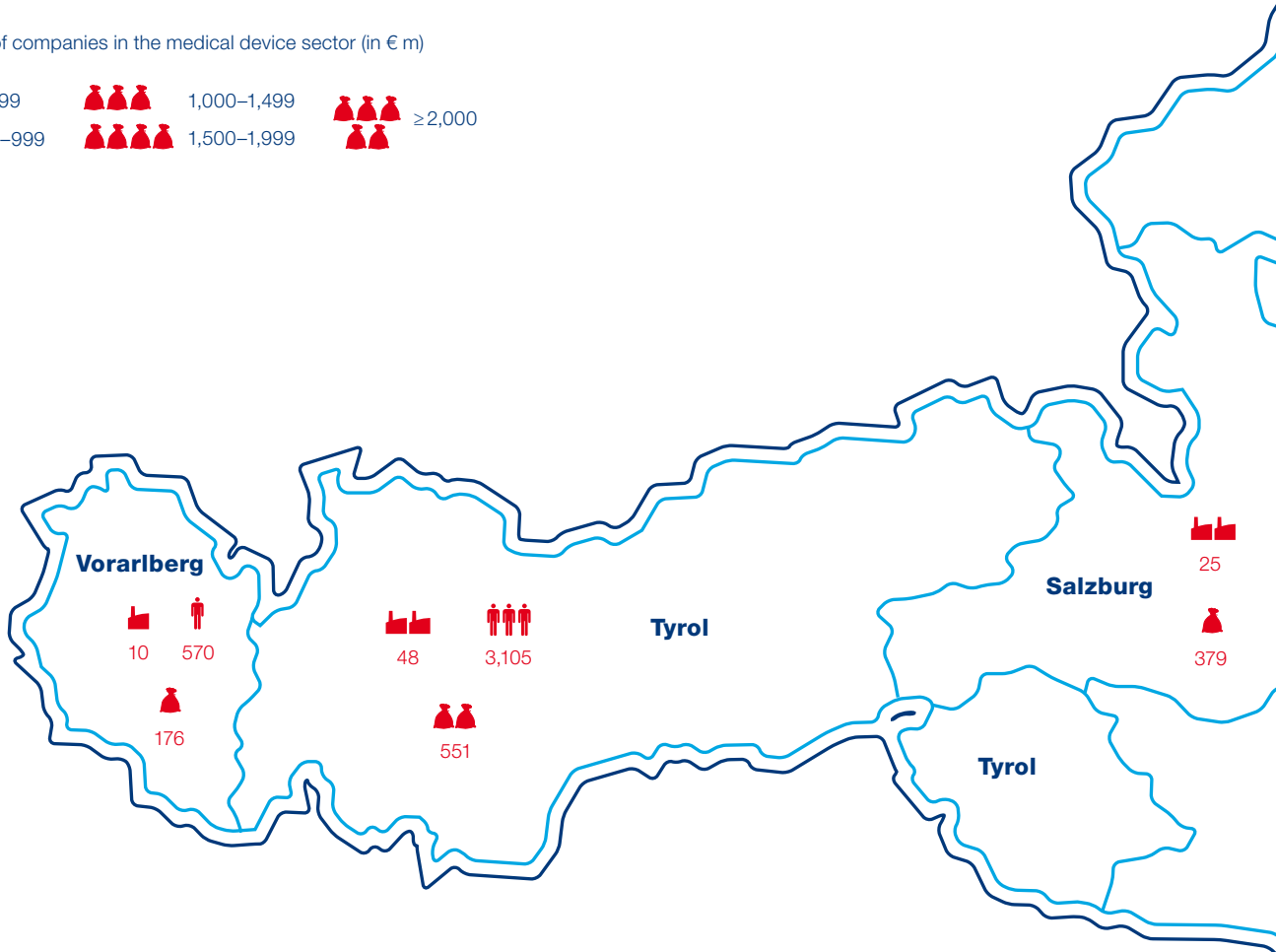
Number of companies in the medical device sector

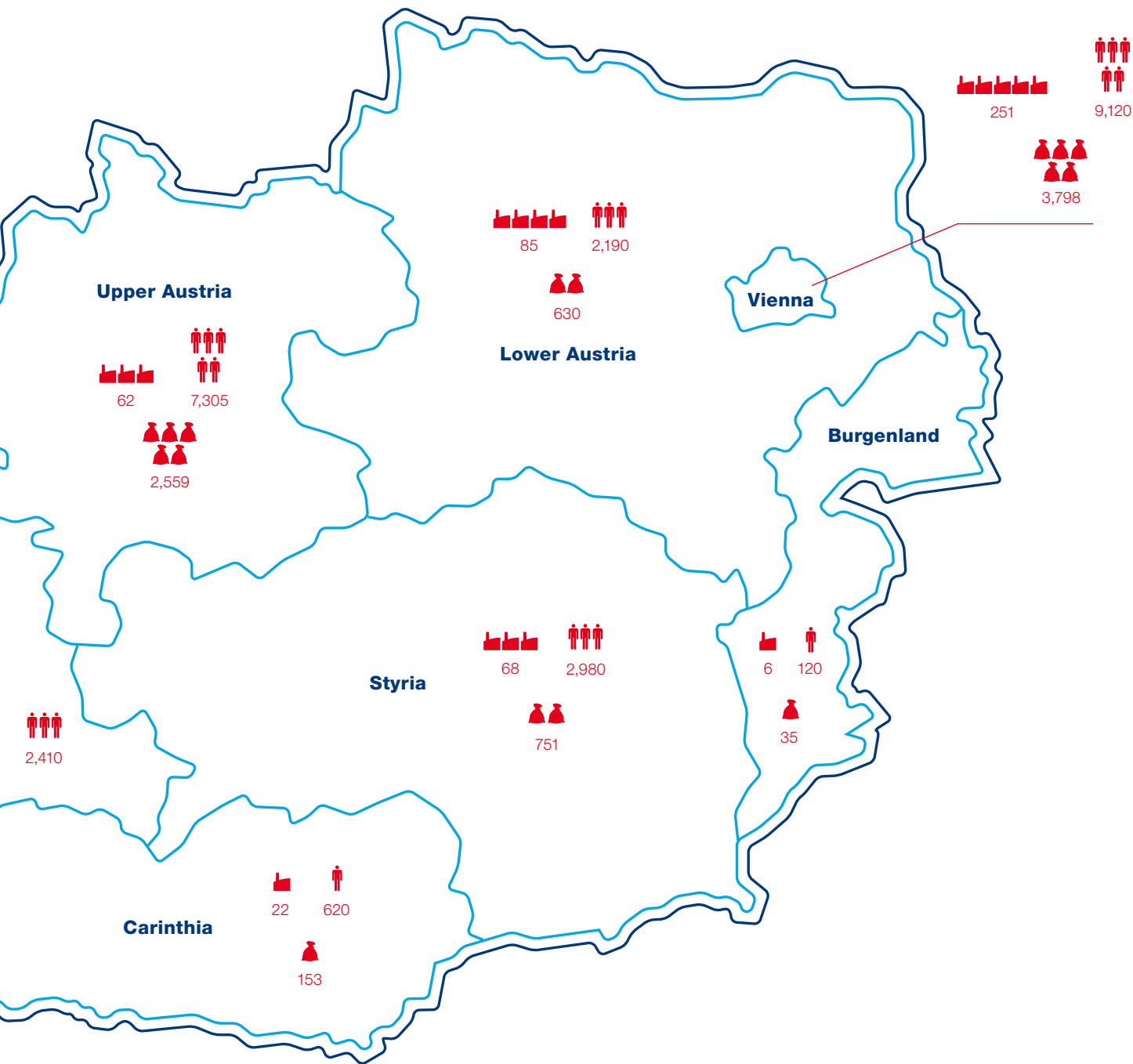


Number of employees in the medical device sector



Turnover of companies in the medical device sector (in € m)





3.1 Dedicated Medical Device Companies Structure and Employees

E-Health, innovative implants, state-of-the-art in vitro diagnostics: In the category ‘dedicated medical device companies’, all firms with activities in one of the Global Medical Device Nomenclature (GMDN) classifications were included (for definitions, see page 48).

Austria is home to 191 dedicated medical device companies. This is an increase of 16% over the last three years. Compared to 2012, the numbers of companies more than doubled. This upturn is mainly due to a high number of start-ups: 26 newcomers set up shop within the last three years.

Mix of traditional companies and start-ups

The young start-ups join a traditional nucleus of the Austrian medical device industry: long-established firms, with roots that reach far back into the past century. On average, an Austrian dedicated medical device company is 16 years old. Almost half of all companies (52%) are younger than ten years. More than one quarter (27%) was established within the last century.

The number of employees mirrors the development of that of the number of companies. This number, too, has increased considerably over the last three years. In 2020, all dedicated medical device companies employed 8,680 people. This is an increase of 11.4% compared to 2017. Compared to 2012, the workforce has significantly increased by 48% (2012: 5,876 employees).

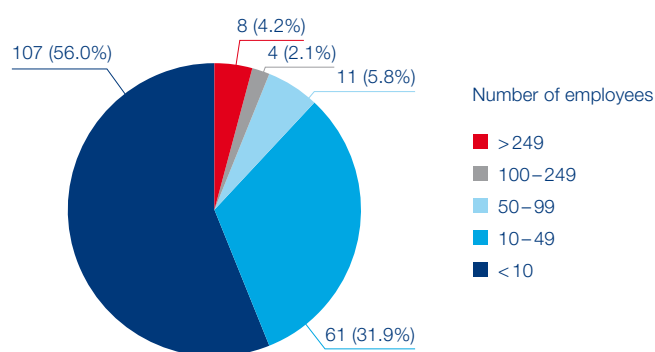


Figure 9: Size structure of dedicated medical device companies in 2020

The typical medical device company is small

According to the EU categorization of small and medium-sized enterprises (SME), the overwhelming majority of the Austrian dedicated medical devices companies is either small or medium-sized. More than half of the companies have a workforce of no more than nine people (107 firms, 56%). Almost one third of companies (61 firms, 31.9%) have ten to 49 employees. Eleven companies employ more than 50 workers (5.8%), and four have a staff of up to 249 (2.1%). At the top of the range, no change can be observed in the last decade: a stable core group of eight Austrian medical device companies employs more than 250 people.

	2012	2014	2017	2020
Number of dedicated medical device companies	124	124	164	191
Number of employees in dedicated medical device companies	5,876	5,980	7,790	8,680
Turnover of dedicated medical device companies	EUR 1.27bn	EUR 1.31bn	EUR 1.77bn	EUR 1.94bn
R&D expenditure of dedicated medical device companies	EUR 104.2m	EUR 128.7m	EUR 156.6m	EUR 174.7m
Financing of dedicated medical device companies	EUR 26.8m	EUR 8.5m	EUR 23.8m	EUR 10.3m

Table 13: Key figures for dedicated medical device companies in Austria 2012, 2014, 2017, 2020

3.1 Dedicated Medical Device Companies

Fields of Activity

In the sector, the fields of activity are highly diverse ranging from blood sugar tests to wheelchairs, CT scanners to syringes – medical device companies in Austria can be found in each and every specialized field of healthcare. As part of the survey, the 191 medical device companies specified their fields of activity according to the GMDN's classification of medical devices. There are currently 14 product classes (see figure 10). Medical devices for the purpose of COVID-19 were additionally surveyed. Hence, instead of focusing in just one field, most companies consider themselves in various categories.

Digital health solutions on the rise

In 2020, software for medicine, telemedicine and e-health played by far the most important role in the business activities of the dedicated medical device companies. More than a third (72 companies, 37.7%) identified themselves in the survey as having skills and products in this category. This figure is on the rise: In the past six years, this number has doubled (2014: 36 companies). Not surprisingly, almost a half of the 26 newcomers in the field belong to this category (11 companies). The 72 companies' products include software solutions that enable clinical personnel to monitor real-time localizations of patients,

establish an emergency call system and work as a protection system for disoriented patients. Only 27 companies (14.1%) consider themselves to be active in the area of electromechanical medical devices. Notable among them are firms focusing on ECG or EEG measurements devices. 26 companies (13.6%) saw themselves in the category of single-use devices. They manufacture products that are used for sampling and storing body fluids such as blood and urine, for example, canulas and small plastic tubes. As with single-use equipment, the reusable devices category has also been a traditional key area in Austria. Twenty companies (10.5%) assigned their products to this category. Among them were companies that produce instruments for ventilation technology and cannulas for tissue biopsies.

Austria also has 17 companies (8.9%) that specialized on in vitro diagnostic (IVD) devices. The Austrian medical device sector is also well-positioned in the field of hospital hardware as wells as products for persons with disabilities. Fifteen companies each (7.9%) fall into these categories. Fourteen companies (7.3%) assigned their products to the category of non-active implantable devices. Each of the remaining classifications only applied to ten companies or fewer. Among them, seven companies offer medical devices in the context of COVID-19.

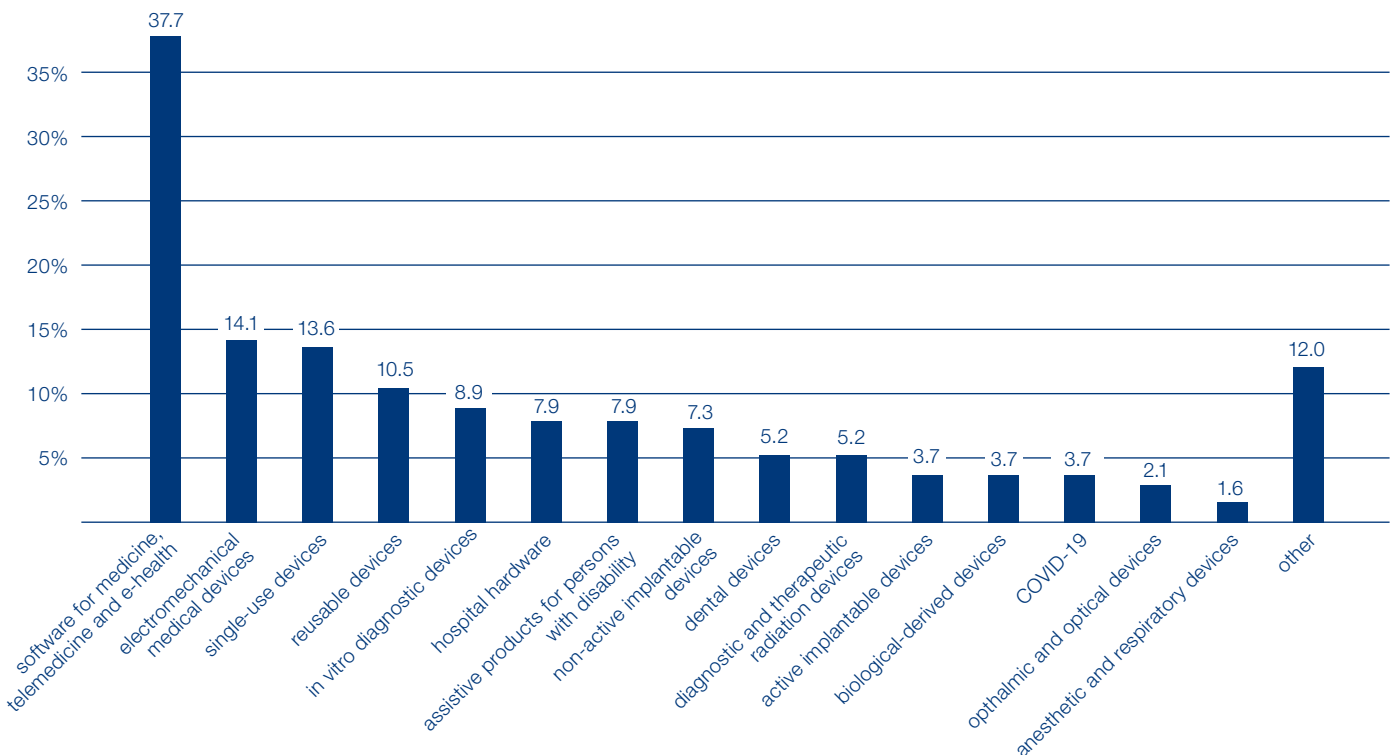


Figure 10: Main areas of activity in dedicated medical device companies in 2020 (multiple answers possible, figures in percent)

3.1 Dedicated Medical Device Companies

Turnover, R&D Expenditure and Financing

Science and industry need to work in close cooperation to boost innovation into clinical practice. Hence, every increase in turnover is a success that underlines the importance of research and development. Having invested in R&D in previous years, it is now the time to reap the rewards. Furthermore, external sources of financing can support this development.

A stable increase in turnover

In 2020, the Austrian medical device sector has seen a dynamic growth in terms of turnover, which reflects the development of the number of companies. In 2020, dedicated medical device companies generated a turnover of 1.94 billion euros – an increase of almost 10% when compared to 2017 (1.78 billion euros). The turnover figures per company show a stable development within the last six years: In 2020, a medical device company recorded a mean turnover of 10.2 million euros. In 2017, the mean turnover per company was about 10.8 million euros, while in 2014, this value had increased to 10.6 million euros. In 2012, the companies' average was 10.2 million euros, identically as in 2020.



Among all the enterprises recorded, six have cracked the 100 million euro turnover threshold. Altogether, these well-established firms account for two thirds of the country's turnover in the dedicated medical device business.

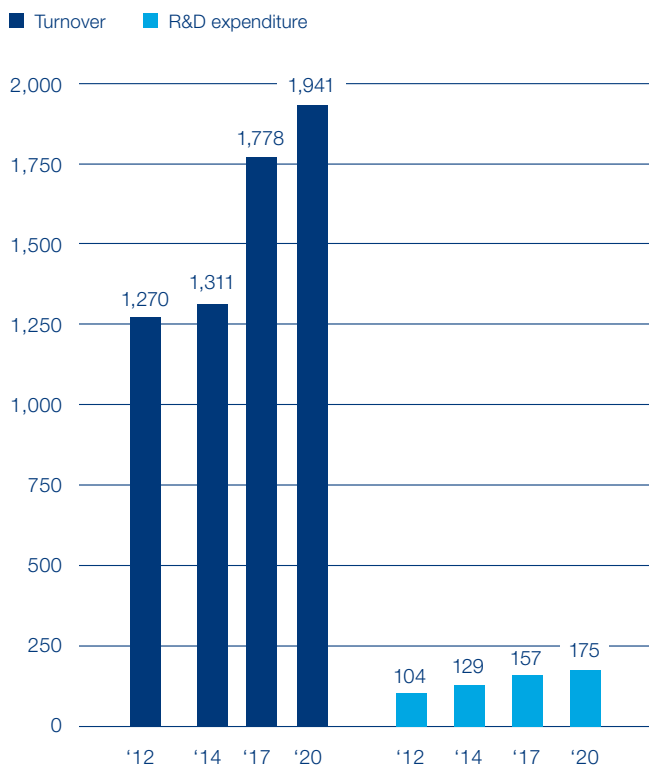


Figure 11: Turnover and R&D expenditure (in € m) of dedicated medical device companies 2012, 2014, 2017, 2020

R&D spending again at record levels

A stable and positive trend can be observed with regard to research and development spending volumes. In 2020, total R&D expenditure of dedicated medical device companies jumped to 175 million euros. Compared to 157 million euros in 2017, this figure is a significant increase of 11.4% and demonstrates the continuously positive economic environment. The percentage of turnover that was reinvested in R&D stayed approximately the same: In 2020, 9.0% of turnover was channeled into R&D. In 2017, that percentage had been 8.9% and in 2014 9.8%. On average, each company spent almost a million euros (0.92 million euros) on research and development.

Ups and downs in financing

With regard to external capital, the numbers have changed quite distinctly over the course of the last few years. With total financings of 26.4 million euros in 2012, the financing situation for Austrian dedicated medical device companies had deteriorated in 2014, when they could only raise 8.5 million euros. However, in 2017, the situation has recovered and companies managed to raise 23.8 million euros. In 2020, the financing situation for Austrian dedicated medical device companies declined again with 10.3 million euros.

3.2 Other Medical Device Companies

Structure, Employees, Fields of Activity and Turnover

Some companies active in the medical device field do not focus exclusively on devices. Instead, this business is just one of numerous activities. These companies are referred to as 'other medical device companies'.

A total of eight Austrian companies have non-core business units operative in the medical device sector (2017: 7 companies). On the one hand, one company that previously belonged to this category gave up their medical device business. On the other hand, two companies joined the group of other medical device companies.

Many of the companies considered to be other medical device companies provide products and services in the field of informatics and telecommunication. It is a small step for them to adapt their software suites and devices to the special needs of medical customers. In addition, some companies specializing in optics and electronics have also decided to build up non-core business units in the medical device industry to benefit from the growing dynamic.

Slight increase in medical device-related areas

In 2020, the eight other medical device companies had a total of 970 employees on their payroll. Compared with 2017, this number remains unchanged (2017: 970 employees). However, the number of people working in the medical device divisions of these firms has marginally increased. In 2020, the number of staff was 770, while in 2017, there had been 750 people working in the segment. This means that eight out of ten employees in the other medical device companies have ties within the medical device industry (79.4%). This percentage had been similar three years ago (77.3%). This demonstrates a solid economic importance of the medical device divisions in these companies over the last three years.

In terms of employee structure, most Austrian other medical device companies are of medium size. Companies employing less than ten staff are uncommon. This is not surprising as very small companies usually find it difficult to fund operations outside their core business areas.

Economic impact on the upswing again

In spite of the small total number of companies, they have a considerable economic impact. In 2020, the eight companies generated a total turnover of 983 million euros, just close under the one billion euro mark, which was only reached in 2014. Compared to 2017, turnover increased by 7% (2017: 918 million euros).

The medical device-related areas of the other medical device companies show significant growth. In 2020, they accounted for 48% of total turnover (475 million euros out of 983 million euros). In 2017, this share was still 39% (356 million euros out of 918 million euros).



	2012	2014	2017	2020
Number of other medical device companies	12	8	7	8
Number of employees in other medical device companies	1,280	1,220	970	970
Number of employees in medical device-related areas of other medical device companies	740	800	750	770
Total turnover of other medical device companies	EUR 990.7 m	EUR 1.01 bn	EUR 918m	EUR 983m
Turnover in medical device-related areas of other medical device companies	EUR 422.1 m	EUR 475 m	EUR 356m	EUR 475 m

Table 14: Key figures for other medical device companies 2012, 2014, 2017, 2020

3.3 Suppliers in the Medical Device Sector

Structure, Employees, Fields of Activity and Turnover

Medical device companies rely on a broad array of high-tech suppliers to design and manufacture sophisticated products such as medical gases, automation, electrical machine building or injection molded devices. Based on the survey, suppliers in the medical device sector generated a turnover of 3.05 billion euros in 2020 – an increase of 5.9% compared to 2017, when the companies accounted for a turnover of 2.88 billion euros. On average, medical device suppliers have a turnover of 50.8 million euros per company.

Mixed bag: Supply companies come in all sizes

Altogether, 60 supply companies provide the Austrian medical device industry with chemicals, commodities and manufacturing equipment. These include both medium-sized and small firms. All-up, the suppliers accounted for 10,120 employees in 2020. Compared to 2017 (9,200 staff), this is an increase of 10% and comes close to the numbers from 2014 and 2012 (10,090 and 10,170 staff, respectively). Exactly 55% of all the supply companies are run by either less than ten people (25%) or less than 50 (30%). Five companies have between 50 and 99 people on the payroll (8.3%). A total of 15 suppliers work with more than 100 but less than 250 employees (25%). Seven firms have a workforce of more than 249 people (11.7%).

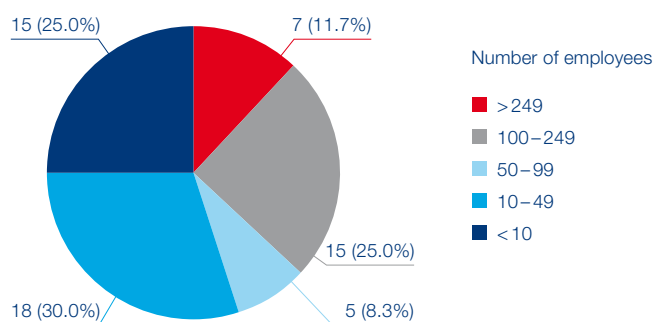
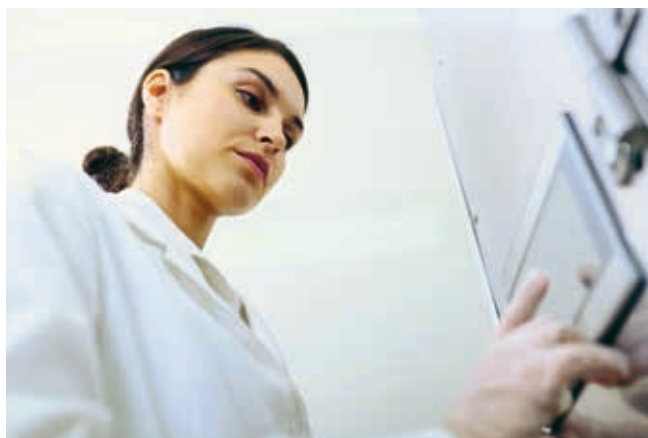


Figure 12: Size structure of suppliers in the medical device sector in 2020

Mechanical and electrical expertise build the fundament of medical device business

Almost one quarter of all suppliers and contractors file a major part of their activities under mechatronics and mechanical engineering (23.3%). The same numbers account for producers of electronic equipment (23.3%). Nearly twenty-two percent (21.7%) carry out plastics machining and processing. Specialists for measurement and sensor technology (18.3%) also reflect a significant part of the medtech supplier sector, as do providers of metal machining and processing (15.0%). Experts for micro- and nanotechnology play a minor but notable role (5.2%).

Beyond that, medical device enterprises also take advantage of the expertise provided by laser technology, ceramic preparation and processing as well as laboratory equipment (3.3% each). Lastly, the area of glass preparation and processing is represented by 1.7%. Companies that do not fall into any of these categories add up to 30%. Within the scope of this study, several companies confirmed their activities in multiple areas of medical devices.

	2012	2014	2017	2020
Number of suppliers in the medical device sector	50	56	58	60
Number of employees of suppliers in the medical device sector	10,170	10,090	9,200	10,120
Turnover of the suppliers in the medical device sector	EUR 2.53 bn	EUR 2.49 bn	EUR 2.88bn	EUR 3.05bn

Table 15: Key figures for suppliers in the medical device sector 2012, 2014, 2017, 2020

3.4 Service Providers in the Medical Device Sector

Structure, Employees, Fields of Activity and Turnover

As with any other industrial sector, medical device companies rely on service providers for work that is not part of their core business. With new challenges in the healthcare system, there is a steady demand for services, not least when it comes to tackling digitization. Austria has the luxury of a highly specialized infrastructure, which delivers the support needed by medical device companies.

Slight increase in company numbers

In 2020, the survey listed 35 companies that offer different services to the medical device industry. This represents a slight increase of almost 10% compared to 2017, when 32 service providers were recorded. This demonstrates that the medical device sector offers attractive opportunities for new companies providing services.

The companies not only cover vastly distinct areas of expertise, they also differ from one another in size. Next to huge enterprises employing more than 1,000 workers, there are start-ups with just a handful of staff.

Fewer employees, more turnover

In total, small companies with fewer than ten employees make up a good 45% of all companies. Thirteen service providers have between 10 to 49 employees on their payroll (37.1%). Not even 10% of all companies work with 50 to 99 employees (3 companies, 8.6%). There is no company with a workforce between 100 and 249 people. Three companies are large enterprises, with more than 249 employees (8.6%).

Altogether, the service providers in the medical device sector accounted for 2,520 employees in 2020. Compared to 2017, when 2,780 employees were on the books, this is a decrease of 9%.

In 2020, service providers in the sector did business worth 395 million euros. Compared to 2017 (355 million euros), this represents a remarkable plus of 11.3%. Given that

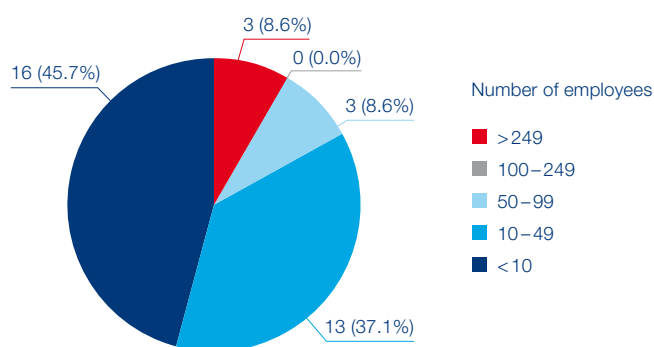


Figure 13: Size structure of service providers in the medical device sector in 2020

there are still comparatively few companies in the sector and the total numbers of its employees are reduced, the figure underlines the economic importance for the medical device sector and Austria's industry as a whole.

IT services make up a third of service providers

The areas of expertise are very varied, which presents an obstacle to making coherent analysis between these companies. However, information technology remains one of the key fields for service providers. Roughly a third of the companies offer electronic data processing, software analysis or other IT services.

Another major field of activity is the segment of washing and processing hospital textiles and clothing, which is an immensely important task for an efficient and quality-driven healthcare system. Other companies provide medtech-specific consulting focusing on engineering, design and production. Other fields include activities in contract research, quality management and regulatory consulting as well as the preparation of units for medical devices. A quarter of all companies responded they work in "other" fields further illustrating the wide variety of activities in this segment.

	2012	2014	2017	2020
Number of service providers in the medical device sector	15	22	32	35
Number of employees of service providers in the medical device sector	2,038	2,280	2,780	2,520
Turnover of service providers in the medical device sector	EUR 281.5 m	EUR 315.5 m	EUR 355 m	EUR 394.9 m

Table 16: Key figures for service providers in the medical device sector 2012, 2014, 2017, 2020

3.5 Sales and Distribution Companies in the Medical Device Sector

Structure, Employees and Turnover

Medical devices are very often sold and distributed from business to business. More likely than not, customers are hospitals, medical practitioners and pharmacies, all with their own processes of procurement. Some manufacturers of medical devices do not trade directly with the retail business but sell their goods wholesale. This is where sales and distribution companies come into play. It is also not uncommon for large international medical device companies to commission autonomous national subsidiaries to penetrate a specific market.

Across Austria, there is a large number of companies either specialized in offering sales and distributing services to the medical devices industry, or active as a sales office of an international corporation. If they have no other business activities, for example research and development or production of medical devices, all of these firms are considered to be sales and distribution companies within the scope of this survey.

Austria's unique geographical position in the midst of Europe makes the country an ideal location for establishing a presence on this continent for non-European enterprises. It should therefore come as no surprise that all of the ten best-selling medical device companies world-wide have sales and distribution offices in Austria. In some cases, these subsidiaries are not only used to address the national market. Often, they influence growth within the sector, triggering the foundation of start-ups in neighboring countries.

Stable growth in turnover for sales and distribution firms

In 2020, there were 283 sales and distribution companies operative in Austria's medical device industry. Compared to 2017, this is a minor decrease of 3.4%. However, the number of employees has risen lightly. There are now 6,130 people on the payroll of sales and distribution companies in the medical device field – an increase of 4.0% compared to 2017 (5,890 employees).

In terms of turnover, the 283 sales and distribution firms constitute a relevant economic factor in the medical device industry. In 2020, they generated 2.66 billion euros in turnover – up from 2.52 billion euros in 2017 (an increase of 5.5%).

Many small-sized companies

With respect to the company structure, the sales and distribution firms are rather small. More than 90% of all companies have less than 50 employees. The average company employs 22 people. There are several factors explaining this situation. Many firms closely affiliated with international parent companies may be able to sustain lean organizational structures. They can obtain such services as legal counseling or accounting from their parent company and have no need to build up extensive back office structures.

Other companies focus on clearly defined market segments. In the case of highly specific products with a small customer base, just a small number of field service employees are needed to cover all Austrian customers.



	2012	2014	2017	2020
Number of sales and distribution companies in the medical device sector	234	277	293	283
Number of employees of sales and distribution companies	5,626	5,590	5,890	6,130
Turnover of sales and distribution companies in the medical device sector	EUR 2.33 bn	EUR 2.33 bn	EUR 2.52 bn	EUR 2.66 bn

Table 17: Key figures for sales and distribution companies in the medical device sector 2012, 2014, 2017, 2020

4.0 Academic Life Science Research and Education in Austria

Overview

A fully fledged academic life science environment is characteristic of Austria's life science sector. A total of 55 institutions, varying in size, have multiple activities in life science research. Due to the broad range of the sector, many disciplines are involved: the expertise lies, in particular, in biological, medical and health sciences, veterinary medicine, agricultural, environmental or industrial biotechnology, bioinformatics and medical engineering. In 2020, COVID-19 related research represents a rapidly emerging and challenging discipline.

Research is the right route to take

All in all, 17 universities, 13 universities of applied sciences and 25 non-university research institutes build the innovative cornerstone of the Austrian life science sector. All of them were active in research and teaching in the life sciences. Moreover, it is a nurturing environment for new commercial activities. Within this report, a total of 46 institutions gave specifications on their life science related staff. According to this, more than 24,000 employees – of which almost two thirds (63%) have a scientific background – were working in the Austrian academic life science sector in 2020.

Life science budget of 1.61 billion euros

With respect to the overall life science budget in the academic field, the report analyzed data made available by 40 institutions. In 2020, this group alone had a specific life science budget of 1.61 billion euros dedicated to teaching, research, administration and infrastructure. About 28% of the budget (457.2 million euros) stems from third-party funds. The high proportion of third party funding demonstrates the high academic excellence of the Austrian life sciences.

Output data

One of the most elegant ways to measure the scientific output of Austrian life science research relies on the total number of publications in this field. According to the 43 institutions that made this information available, more than 15,000 papers (only with first and/or last authorship of the Austrian institution) were published in peer-reviewed journals in 2020. Besides high-quality research, a primary task of the academic institutions is to provide the sector with well-trained and highly qualified people. In 2020, the total number of life science students at universities and universities of applied sciences amounted to more than 77,000, of which more than half were women.

	2014	2017	2020
Number of research and education institutions active in life sciences	55	55	55
Number of life science employees (n=52 n=52 n=46)	19,830	21,145	24,294
Number of life science employees in R&D (n=49 n=37 n=43)	11,229	12,271	15,262
Number of life science students (n=28 n=28 n=29)	59,166	67,218	77,366
Total life science budget of research and education institutions (n=43 n=42 n=40)	EUR 1.44 bn	EUR 1.55 bn	EUR 1.61 bn
Third party funding for research and teaching institutions in life sciences (n=41 n=40 n=38)	EUR 385.6 m	EUR 412.2 m	EUR 457.2 m
Number of peer-reviewed academic publications in life sciences (n=43 n=47 n=43)	8,779	9,363	15,169

Table 18: Key figures for research and education institutions active in life sciences 2014, 2017, 2020 (n=number of responses)

Map of the Life Science Research and Education Sector

Distributed According to Federal States

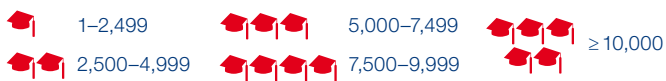
Number of research and education institutions active in life sciences



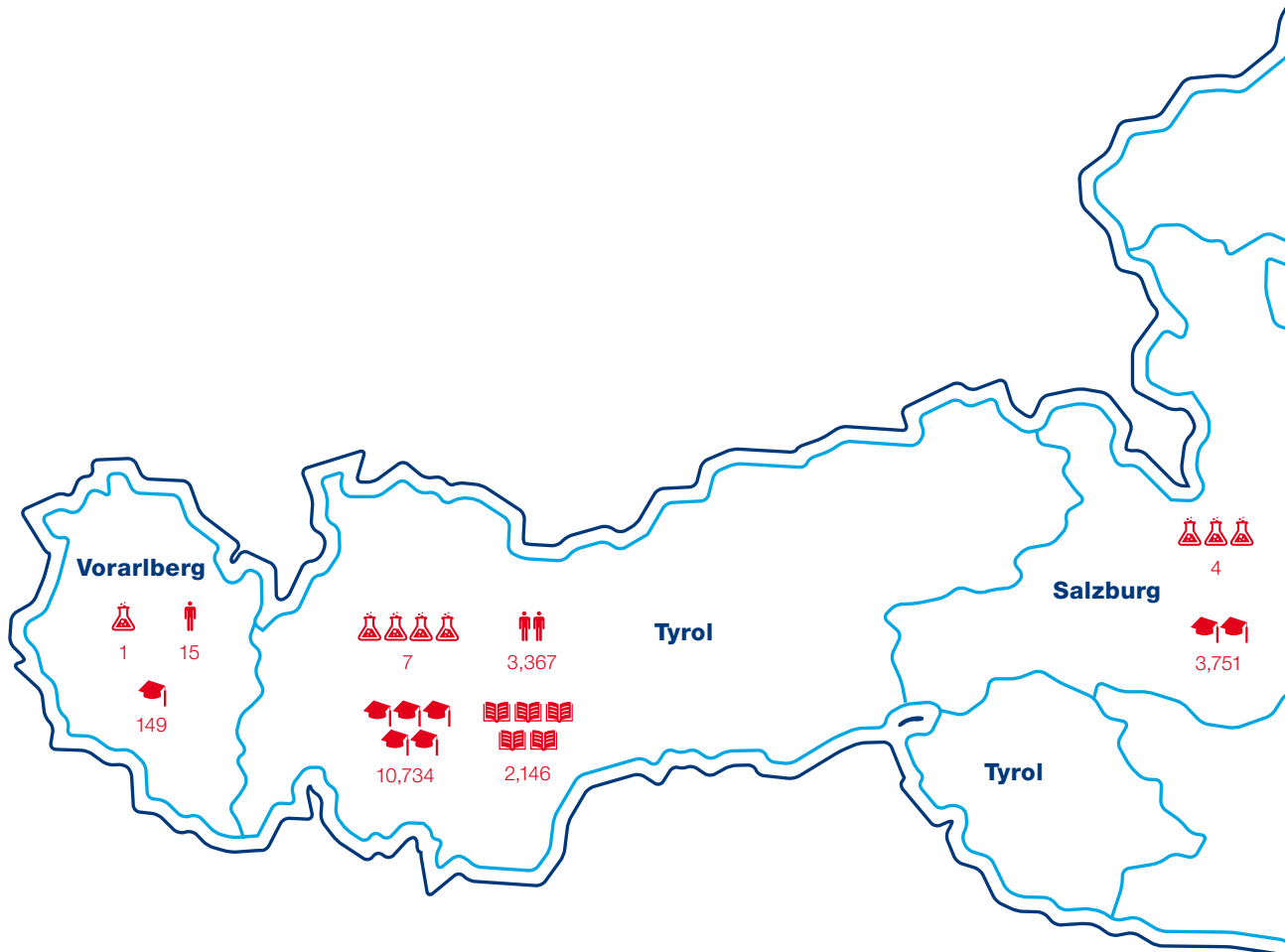
Number of life science employees

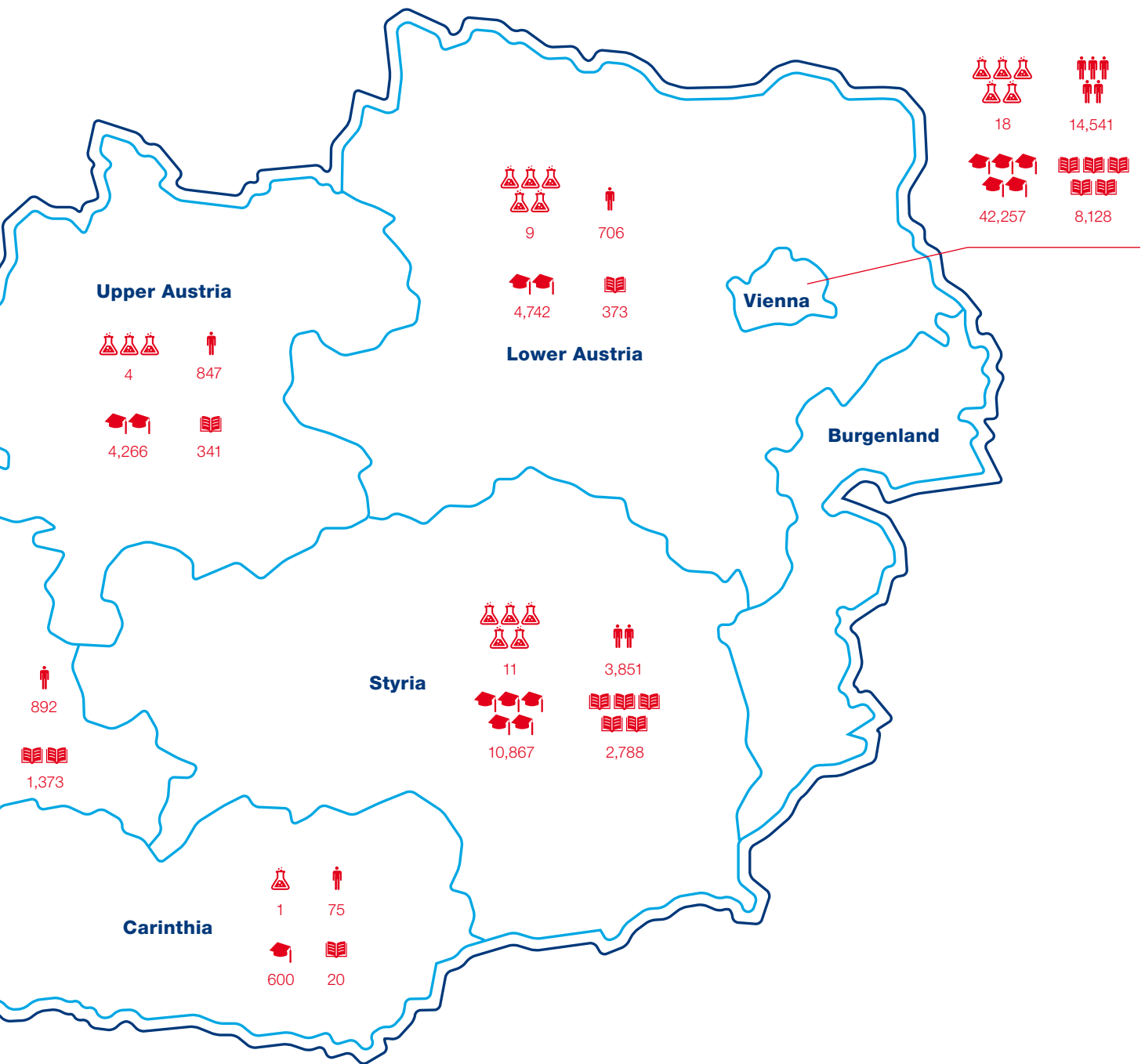


Number of life science students



Number of peer-reviewed academic publications in life sciences





4.1 Universities

Focus, Employees, Students, Budget and Publications

Austria's universities can look back on a long history. The oldest one is more than 650 years old. Names such as Semmelweis, Billroth and Landsteiner have promoted the international recognition of the Austrian life sciences. Today, a total of 17 universities are active in the field of life sciences. Their teaching and research activities cover all fields of life sciences ranging from biological, medical, pharmaceutical and health sciences, veterinary medicine to environmental, industrial and agricultural biotechnology as well as bioinformatics and medical engineering.

Attractive environment for 21,000 employees

Austrian universities are an attractive workplace for highly skilled people. In 2020, all 17 universities specified their number of workforce. They recorded a total of 21,109 life science related employees. The proportion of researchers is high: Sixty-two percent of the university employees work in scientific areas. Their scientific success was measured with regard to the number of peer-review publications. Sixteen universities answered the respective part of the survey. In 2020, they released more than 14,000 papers with relevance to the life sciences, an increase of 60% compared to 2017.

Although only thirteen institutions specified their financial situation in the survey, their institutional budget for life sciences totaled 1.3 billion euros – similar to 2017, when twelve universities made their information available. This amount includes teaching, research, administration and infrastructure costs. The 13 universities which reported the volume of their third-party funding had 323 million euros of external money available in 2020.

Almost 68,000 life science students

Among students, there is a growing interest in the diverse life science fields. 67,622 students were reported in 2020. This is an increase of 12% within the last three years and continues the upward trend (2017: 60,222 students; 2014: 54,196 students).



	2014	2017	2020
Number of universities active in life sciences	17	17	17
Number of life science employees (n=16 n=15 n=17)	16,879	18,068	21,109
Number of life science employees in R&D (n=15 n=10 n=17)	9,075	10,246	13,095
Number of life science students (n=16 n=15 n=16)	54,196	60,222	67,622
Total life science budget of universities (n=13 n=12 n=13)	EUR 1.18 bn	EUR 1.3 bn	EUR 1.3 bn
Third party funding for universities in life sciences (n=15 n=14 n=13)	EUR 270.3 m	EUR 301.9 m	EUR 322.6 m
Number of peer-reviewed academic publications in life sciences (n=15 n=17 n=16)	7,826	8,481	14,162

Table 19: Key figures for universities active in life sciences 2014, 2017, 2020 (n=number of respons-

4.2 Universities of Applied Sciences

Focus, Employees, Students, Budget and Publications

Universities of applied sciences are an important element of tertiary education within the life science sector. Their focus lies in practically oriented higher education. In respect to the various disciplines within life sciences, they provide strong links to either the public or private health sector and include entrepreneurial training as well.

Scope and capacities

In Austria, a total of 13 universities of applied sciences are active in the life sciences. Their scope of teaching is broad: the field of biological and health sciences is covered as well as biotechnology and engineering disciplines.

Eleven of the 13 institutions specified their number of workforce. Together, they accounted for 936 employees in 2020. A total of 341 employees teach and/or work as researchers in the life sciences – more than one third of all the employees. Eleven universities of applied sciences answered the questions regarding their scientific publishing activities, two more than 2017. They recorded a total of 161 life science publications in peer-reviewed journals in 2020 and almost tripled compared to 2017 (57 publications).

All 13 institutions published data on their educational capacities within this survey. They reported a total of 9,737 students in the life sciences – quite a significant jump of 39% compared to 2017 (6,996 students).

Life science budget

A total of eleven institutions disclosed their financial situation within the report. According to this, they had a combined life science budget of 51.3 million euros in 2020. Almost 14 million euros stem from third-party funds. Compared to 2017, the numbers reflecting the financial situation of the universities of applied sciences nearly doubled.

	2014	2017	2020
Number of universities of applied sciences active in life sciences	13	13	13
Number of life science employees (n=12 n=13 n=11)	398	621	936
Number of life science employees in R&D (n=12 n=10 n=11)	166	268	341
Number of life science students (n=12 n=13 n=13)	4,970	6,996	9,737
Total life science budget of universities of applied sciences (n=9 n=11 n=10)	EUR 26.2 m	EUR 26.6 m	EUR 51.3 m
Third party funding of universities of applied sciences in life sciences (n=9 n=11 n=11)	EUR 12.7 m	EUR 7.34 m	EUR 13.9 m
Number of peer-reviewed academic publications in life sciences (n=8 n=9 n=11)	75	57	161

Table 20: Key figures for universities of applied sciences active in life sciences 2014, 2017, 2020 (n=number of responses)

4.3 Non-University Research Institutes

Focus, Employees, Budget and Publications

The non-university research sector in Austria's academic landscape is relatively young. Most of the 25 institutions relevant to life sciences were founded within the past 20 years. They cover a multitude of disciplines within the life science field, ranging from molecular biology and medicine to medical engineering and biotechnology.

Half a dozen big players

Alongside a range of smaller entities, there are six major non-university research institutes in this category. Among them is the nonprofit Research Institute of Molecular Pathology (IMP), which is largely sponsored by the pharmaceutical company Boehringer Ingelheim. Also in this group are the Institute of Molecular Biotechnology (IMBA), the Gregor Mendel Institute (GMI) and the Center of Molecular Medicine (CeMM) – all of which belong to the Austrian Academy of Sciences. The other two entities are the Institute of Science and Technology Austria (IST Austria) and the Austrian Institute of Technology (AIT). Apart from the IMP, all of these institutions receive institutional funding from the Austrian government. The IMP, IMBA and GMI are located at the Campus Vienna Biocenter and represent the heart of the internationally renowned biomedical research center.

Internationally renowned cutting-edge research

The primary task of the non-university research institutes is to perform excellent, cutting edge and innovative research; training activities are carried out only at PhD and postdoc levels. The major non-university research institutes provide a well-equipped, internationally oriented research environment, attracting highly educated people from across the globe.

In 2020, the non-university research institutes in Austria had a combined life science staff of 2,249 people. Most of them are working as researchers (81%). About half (50.5%) are women. Sixteen institutes specified their publication output. According to this, they released 846 papers in peer-reviewed journals in 2020 – a notable increase from 2017, especially when considering that more institutions had provided this information three years ago.

Within the framework of the survey, 17 institutions disclosed their budget information. Together, they accounted for a budget of 242 million euros. Fourteen institutes reported on their third-party funds for life sciences, which added up to 121 million euros of external money.

	2014	2017	2020
Number of non-university research institutes active in life sciences	25	25	25
Number of life science employees (n=25 n=24 n=18)	2,553	2,456	2,249
Number of life science employees in R&D (n=23 n=17 n=15)	1,988	1,757	1,826
Total life science budget of non-university research institutes (n=21 n=19 n=17)	EUR 234.5 m	EUR 225.4 m	EUR 241.8 m
Third party funding of non-university research institutes in life sciences (n=17 n=15 n=14)	EUR 102.6 m	EUR 102.9 m	EUR 120.7 m
Number of peer-reviewed academic publications in life sciences (n=19 n=21 n=16)	878	825	846

Table 21: Key figures for non-university research institutes active in life sciences 2014, 2017, 2020 (n=number of responses)

5. Outlook Life Sciences in Austria

The life sciences evolved substantially to one of the fastest growing driving engines of industrialized nations. Innovative breakthrough technologies from the biotechnological, pharmaceutical and medical device sector offer a huge potential for tackling major challenges of the health systems with unmet demand: the need for innovative drugs, efficient therapies and molecular diagnostics is higher than ever. The world community only begins to rebuild due to the coronavirus pandemic, and innovation has shown its tremendous capacity for solutions. Altogether, the relevance of a strong life science sector was demonstrated when it showed its resilience and sustainability on an international economic level.

Besides emerging biological threats, demographic change and climate change force companies and governments to implement more effective infrastructures to deal with aging societies and growing populations. Meanwhile, countries all over the world move steadily towards a sustainable bio-based economy, combining the progress made in natural sciences and green technologies with the experiences in IT-related areas and digitization to meet the global Sustainable Development Goals (SDGs) of the United Nations. Austrian stakeholders in science, economy and policy actively take part in this development and together built a strong life science sector with an up-to-date infrastructure and well-established scientific institutions and enterprises.

To date, Austria offers an excellent environment for effective high-quality research & development (R&D) within an ideal network of internationally renowned scientific centers. This enables state-of-the-art technology development and supports attractive business opportunities in the heart of Europe. This is particularly true for the healthcare sector.

Not only are hundreds of biotechnology, pharma and medical companies active in this field, Austria is also home to service providers, suppliers and sales companies, bringing a wide range of innovative drugs, diagnostics and medical devices to patients. The relevance of the Austrian life science sector is further illustrated by key economic figures: More than 7% of the Austrian GDP is directly or indirectly generated by the life science sector, underlining the essential role of healthcare as an economic driving force. With a turnover of more than 25 billion euros a year, the Austrian life science industry is a significant and growing economic factor, which demonstrates its importance for the entire nation.

Austria – leading in innovation and translation

Without the government's strong commitment to support the life sciences and to foster R&D capabilities all over the country, this success would not have been possible. In 2020, the Austrian Federal Ministry for Digital and Economic Affairs together with the European Investment Fund (EIF, Luxemburg) and the Max Planck Foundation (Munich,



Germany) invested a total volume of 60 million euros into the KHAN-I fund. Together with its Austrian subsidiary wings4innovation, KHAN-I offers a professional translational research center bringing together 19 leading Austrian research entities in the life sciences which intend to commercialize promising early drug development projects in line with industry standards. In addition, the Austrian government strongly supports further cooperation on a European level with regard to pandemic preparedness. Based on the COVID-19 experiences, the further establishment of resilient supply chains in the manufacturing of drugs, diagnostics and medical products will be supported.

Personalized medicine and digitalization on the rise

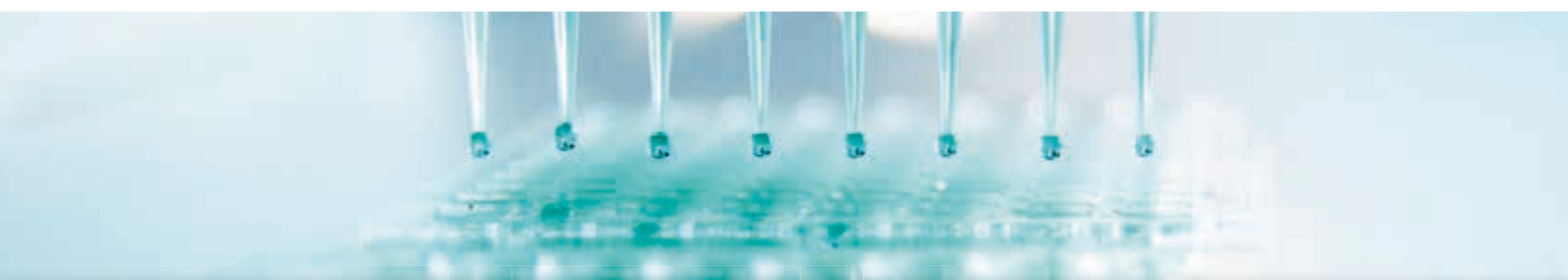
Regardless of a long-term management of health threats, further trends such as personalized medicine and digitalization are major challenges to be addressed as well. The development of tailor-made drugs for specific patient populations, sensitive point-of-care diagnostics and mobile applications are already gaining momentum in the healthcare practice. In this regard, artificial intelligence is likely to play a pivotal role in the near future, for instance with regard to better disease prevention, faster drug development and intelligent medical products.

Industrial biotechnology comes into focus

However, the impact of the life sciences is not limited to healthcare. Due to increasing global warming, climate change and economic resilience needs, sustainability challenges are on the top of the agenda of most major industries. For this reason, there is large and growing demand to offer climate-friendly and bio-based manufacturing processes using renewable raw materials and novel technologies. With the European Green Deal, Europe has manifested its ambitious goals in that respect and Austria is well positioned to support this development – among others, with hosting Europe's leading event on Industrial Biotechnology and Bioeconomy, the EFIB 2021, in Vienna for the very first time.

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6. Methodology

Overview

The life science industry in Austria is fully diversified with companies active in the field of biotechnology and pharma on the one hand, and in medical devices on the other. For the purposes of this survey, BIOCUM AG compiled a questionnaire addressing the specifications for each part of the sector.

For biotechnology and pharma, the survey was based on definitions outlined by the Organisation for Economic Cooperation and Development (OECD) in 2004. Here, the OECD standardized the huge range of existing definitions for the term biotechnology. Since then, all OECD countries have been called upon to carry out surveys on biotechnology following the so-called Framework for Biotechnology Statistics (www.oecd.org). Based on these definitions, different categories of companies have been established: “dedicated biotechnology companies” and “other biotechnology active companies”. In addition, pharmaceutical companies were surveyed. These three categories are summarized as “research, development or manufacturing companies”.

Based on the methodology change for the statistics in 2017, subsidiaries of companies whose purpose includes not only the distribution of products but also the preparation and monitoring of clinical trials were included as “research, development or manufacturing companies” according to the respective category (for definitions see page 47).

There are two challenges when implementing a survey in the medical device sector: firstly, the field is extremely diverse. Secondly, due to the high innovation rate, new and above all innovative products are continually being added. At licensing level, the term ‘medical device’ applies as specified in EU regulation 2017/745. The regulation differentiates between medical devices, accessories, in vitro diagnostic medical devices and custom-made devices. The Global Medical Device Nomenclature (GMDN) was introduced in November 2001 to better illustrate the different facets of medical devices in international comparison. GMDN is adjusted on an ongoing basis and currently contains 14 main categories with almost 9,000 terms and over 10,000 synonyms for medical devices (see page 48). The nomenclature was adjusted for the survey. One category (supplementary equipment) was deleted and two new ones were added: ‘software for medicine, telemedicine and e-health’ and ‘others’.

In addition, the sector covering suppliers, service providers, sales and distribution companies was also addressed within the scope of this study. The following definitions have been used for the questionnaire in both the biotechnology and pharma sector and the medical device sector:

Supplier: manufacturer of products which are directly used for the manufacture of biotech/pharma/ medtech products.

Service provider: company with specific services which are necessary for the manufacture or direct use of biotech/pharma/medtech products.

Sales and distribution company: company that sells or distributes approved biotech/pharma/ medtech products.

Also research institutes in the life science sector were included in the statistics. The questionnaire was based on set definitions from sections of the OECD’s “Revised Field of Science and Technology Classification in the Frascati Manual” (for definitions see page 49).

Between April and June 2021, a total of 982 companies were contacted and requested to complete the survey. 211 of the companies answered either by questionnaire or by telephone, corresponding to a response rate of 21,5% (for more details, see table 22 on the next page). Based on common statistical practice, the data from the survey was extrapolated up to 100% on the basis of subgroups with structurally comparable companies.

During the same period, 55 research institutes were contacted. 38 answered by questionnaire or by telephone, corresponding to a response rate of 69,1%. Extrapolations were not carried out for data from research institutions. As needed, further information such as from annual reports or other publicly available sources has been added.

While selecting companies to participate, extreme care was taken to include all enterprises which are resident in Austria and which are active in life sciences. Therefore, companies that are majority-owned from outside Austria but have a company office in Austria were also considered. In surveying the employee figures, number of companies and fields of activity, the survey included only the Austrian locations of a company. If an enterprise had more than one location in Austria, only cumulated figures and data for the company as a whole were considered. The reference date of the survey was 31.12.2020.

	requested/answered	response quote
Life science companies	982/211	21,5%
Biotechnology and pharma companies	405/123	30,4%
Research, development or manufacturing biotechnology and pharma companies	235/90	38,2%
Dedicated biotechnology companies	151/67	44,3%
Other biotechnology active companies	49/14	28,5%
Pharma companies	35/9	25,7%
Suppliers, service providers, sales and distribution companies	170/33	19,4%
Suppliers	30/8	26,7%
Service providers	40/16	40,0%
Sales and distribution companies	100/9	9,0%
Medical device companies	577/88	15,2%
Research, development or manufacturing medical device companies	199/38	19,0%
Dedicated medical device companies	191/35	18,3%
Other medical device companies	8/1	12,5%
Suppliers, service providers, sales and distribution companies	378/50	13,2%
Suppliers	60/7	11,7%
Service providers	35/6	17,1%
Sales and distribution companies	283/37	13,1%
Research and education institutions active in life sciences	55/38	69,1%
Universities	17/10	58,8%
Universities of applied sciences	13/9	69,2%
Non-university research institutes	25/19	76,0%

Table 22: Overview of response quotes of different types of life science companies and life science research and education institutions 2020

6.1 Methodology Biotechnology and Pharma Sector

Definitions

Biotechnology

... is defined as the application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods, and services.

A dedicated biotechnology company

... is defined as a biotechnology active firm whose predominant activity involves the application of biotechnology techniques to produce goods or services and/or the performance of biotechnology R&D.

An other biotechnology active company

... includes all types of companies that may employ biotechnological techniques to produce goods or services, but that also have non-biotechnological business areas. This also includes pharma firms, provided they use biotechnological techniques.

A pharma company

... is defined as a company whose predominant activity relates to the development and/or manufacturing of drugs without applying biotechnological methods.

A research, development or manufacturing biotechnology and pharma company

... is either a dedicated or an other biotechnologically active or a pharma company. In each category, subsidiaries of the companies whose purpose is not only the distribution of the products, but also the preparation and monitoring of clinical trials, are included.

Definition of biotechnology and the type of firms categorized for the use of this study

Health/Medicine

Development of therapeutics and/or diagnostics for the field of human medicine, drug delivery, human tissue replacement

Animal health

As above, for veterinary application

Agrobiotechnology

Genetically modified plants, animals or microorganisms, as well as non-genetically modified plants grown using biotechnological procedures, for use in agriculture or forestry

Industrial biotechnology

Biotechnological products and processes for the handling of waste or sewage, for chemical synthesis, for the extraction of raw materials and energy etc.

Non-specific services

Equipment or reagents based on biotechnological principles, for research or provision of services in this field ('ancillary industry')

Definition of the fields of activity of dedicated biotechnology companies according to the OECD

6.2 Methodology Medical Device Sector

Definitions

Medical device

... is defined through the Global Medical Device Nomenclature (GMDN) as any instrument, apparatus, appliance, material or other article, whether used alone or in combination, including the software necessary for its proper application, intended to be used for human beings for the purpose of: diagnosis, prevention, monitoring, treatment or alleviation of disease, injury or handicap.

A dedicated medical device company

... is defined as a company whose predominant activity relates to the development and/or manufacturing of medical products as defined through the Global Medical Device Nomenclature (GMDN).

An other medical device company

... includes all types of companies that may develop and/or manufacture medical products as defined through the Global Medical Device Nomenclature (GMDN), but that also have non-medical device business areas.

A research, development or manufacturing medical device company

... is either a dedicated or an other medical device company.

Definitions of medical device and the type of firms categorized for the use of this study

Code	Explanation	Examples
01	Active implantable devices	Cardiac pacemakers, neurostimulators
02	Anesthetic and respiratory devices	Oxygen masks, ventilators for anesthesia, gas supply units
03	Dental devices	Dental equipment, fillings
04	Electromechanical medical devices	ECG, EEG, sonography machines, lasers
05	Hospital hardware	Hospital beds
06	In vitro diagnostic devices	Pregnancy test, blood sugar tests, genetic tests
07	Non-active implantable devices	Hip and knee joints, arterial stents
08	Ophthalmic and optical devices	Spectacles, contact lenses, ophthalmoscopes
09	Reusable devices	Surgical instruments, endoscopes, blood pressure cuffs, stethoscopes, skin electrodes
10	Single-use devices	Syringes, needles, latex gloves, balloon catheters
11	Assistive products for persons with disability	Wheelchairs, walking aids, hearing aids
12	Diagnostic and therapeutic radiation devices	X-ray equipment, CT, radiotherapy equipment
13	Biological-derived devices	Substitute tissue, products of regenerative medicine
14	Software for medicine, telemedicine and e-health	
15	Others	

Table 23: Overview of the fields of activity based on the Global Medical Device Nomenclature (GMDN)

6.3 Methodology Academic Life Science Research and Education

Definitions

Sciences	Technologies
1. Natural Sciences	
Computer and Information Sciences	– Bioinformatics
Biological sciences	– Cell biology, microbiology, virology, biochemistry and molecular biology, biochemical research methods, mycology, biophysics – Genetics and heredity (medical genetics to be 3), reproductive biology (medical aspects to be 3), developmental biology – Plant sciences, botany – Zoology, ornithology, entomology, behavioral sciences biology – Marine biology, freshwater biology, limnology, ecology, biodiversity conservation – Biology (theoretical, mathematical, thermal, cryobiology, biological rhythm), evolutionary biology, other biological topics
2. Engineering and Technology	
Medical engineering	– Medical engineering, medical laboratory technology (including laboratory samples analysis, diagnostic technologies) ...
Environmental biotechnology	– Environmental biotechnology, bioremediation, diagnostic biotechnologies (DNA chips and biosensing devices) in environmental management, environmental biotechnology related ethics
Industrial biotechnology	– Industrial biotechnology, bioprocessing technologies (industrial processes relying on biological agents to drive the process) biocatalysis, fermentation, bioproducts (products that are manufactured using biological material as feedstock) biomaterials, bioplastics, biofuels, bio-derived bulk and fine chemicals, bio-derived novel materials
3. Medical and Health Sciences	
Basic medicine	– Anatomy and morphology, human genetics, immunology, neurosciences (including psychophysiology), pharmacology and pharmacy, medicinal chemistry, toxicology, physiology (including cytology), pathology
Clinical medicine	– Andrology, obstetrics and gynaecology, paediatrics, cardiac and cardiovascular systems, peripheral vascular disease, Hematology, respiratory systems, critical care medicine and emergency medicine, anaesthesiology, orthopaedics, surgery, radiology, nuclear medicine and medical imaging, transplantation, dentistry, oral surgery and medicine, dermatology and venereal diseases, allergy, rheumatology, endocrinology and metabolism (including diabetes, hormones), gastroenterology and hepatology, Urology and nephrology, oncology, ophthalmology, otorhinolaryngology, psychiatry, clinical neurology, geriatrics and gerontology, general and internal medicine, other clinical medicine subjects, Integrative and complementary medicine (alternative practice systems)
Health sciences	– Health care sciences and services (including hospital administration, health care financing), health policy and services – Nursing, nutrition, dietetics – Public and environmental health, tropical medicine, parasitology, infectious diseases, epidemiology – Occupational health, sport and fitness science – Social biomedical sciences (includes family planning, sexual health, psycho-oncology, political and social effects of biomedical research), medical ethics, substance abuse
Medical biotechnology	– Health-related biotechnology, technologies involving the manipulation of cells, tissues, organs or the whole organism (assisted reproduction), technologies involving identifying the functioning of DNA, proteins and enzymes and how they influence the onset of disease and maintenance of well-being (gene-based diagnostics and therapeutic interventions (pharmacogenomics, gene-based therapeutics), biomaterials (as related to medical implants, devices, sensors), medical biotechnology related ethics
Other medical sciences	– Forensic sciences – Other medical sciences
4. Agricultural Sciences	
Veterinary science	– Veterinary medicine
Agricultural biotechnology	– Agricultural biotechnology and food biotechnology, GM technology (crops and livestock), livestock cloning, marker assisted selection, diagnostics (DNA chips and biosensing devices for the early/accurate detection of diseases) biomass feedstock production technologies, biopharming, agricultural biotechnology related ethics

Table 24: Relevant fields of science and technology according to the classification in the Frascati Manual (OECD)

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