austria wirtschaftsservice aws

aws Life Science Austria

Life Science Report Austria 2018

Introduction

Health care represents one of the top priorities amongst the big challenges of our times and indeed the health sector provides society with the most visible benefits of the life sciences. Furthermore, the Austrian life sciences sector is of fundamental economic and socio-economic importance and plays a key role for the Austrian economy.

In most industrialized countries, applications in biotechnology and medical technology are an important strategic field for future developments and investments. Thus, the life sciences are a crucial element in the current Austrian FTI 2020 Strategy, further reflected in a dedicated Life Sciences Strategy published in late 2016. Furthermore, life sciences continue to be a quintessential topic in the current research policy and are likely to maintain this leading role over the next years.

For more than 20 years, life sciences benefit from a supportive funding environment in Austria. In addition to excellent, mostly bottom-up cooperation programs like COMET Competence Centers for Excellent Technologies and the Christian Doppler labs, the program “Life Science Austria” (LISA) is the main source of support in the applied life sciences sector. Focusing on biotechnology/pharma and medical products, LISA encourages, coaches and fuels life sciences entrepreneurs, supports Austrian life sciences clusters and represents Austrian life sciences companies abroad. The support measures range from monetary support such as PreSeed and Seedfinancing, LISA International Marketing to the international life sciences business plan competition “Best of Biotech” (BoB) that includes extensive mentorship.

Current figures demonstrate the success of the program. Between 2015 and 2017, more than half of the 104 teams competing in Best of Biotech did set up a life sciences company. Thus, the program has been involved in the creation of 58 innovative SMEs as well as raised 18 Mio € of PreSeed and Seedfinancing capital to support 42 companies active in the field.

Moreover, LISA, in cooperation with the Austrian life sciences clusters, supported Austrian life sciences companies to present their innovations in 21 exhibitions and fairs in Europe and the US. Finally, also the present report derives from LISA activities.

This report presents key figures on the Austrian life sciences sector as well as data on basic research institutions. The figures, collected according to OECD standards, are of important analytical value and the report serves as main reference for the Austrian life sciences sector.

Current data show that the sector continues to grow. Enhancing fruitful cooperation between science and markets as well as providing a supportive funding environment to young companies are key measures to keep up this trend. The Life Science Report 2018 demonstrates that in this sector Austria is the place to be. The international partnering event BioEurope Spring 2019 in Vienna will give an international audience the opportunity to learn more about our innovative life sciences industry.

Dr. Margarete Schramböck
Federal Minister for Digital and Economic Affairs

Preface

Over the past decade, Austria has established itself as a well-respected hub of the life science industry. Region by region, the life science industry has spread across Austria from the capital Vienna to the powerhouses of Styria, Tyrol and Upper and Lower Austria. Each region has its own special culture and particular strengths that are reflected in the local companies who are organised through regional life science clusters.

The growth of the life science sector is reflected in the increasing interest shown by international businesses in doing deals with companies in Austria. And it is not just the rise in corporate deals that shows Austria in a good light: the country is also proving to be an attractive location for operations and significant inward investment for a number of multinational companies. These investments come on top of a whole series of international venture capital investments in Austrian life science.

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.

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. With R&D investment in 2017 at an all-time high of 3.14% of GDP, the government aims even higher: to make Austria an innovation leader within the European Union and to raise the share of R&D investment to 3.76% of GDP by 2020. There is also a very supportive and attractive tax regime, an R&D cash premium of 14% and a maximum corporate income tax of 25%.

Furthermore, the wide array of funding schemes available to life science start-ups contributes to this thriving environment. austria wirtschaftsservice, the Austrian national promotional bank, provides financial support for start-up ideas for life-sciences through its funding programmes ‘LISA PreSeed’ and ‘LISA Seedfinancing’. Money for the programmes is provided by the Federal Ministry of Digital and Economic Affairs and expertise by the aws.

By providing low-interest loans, guarantees, subsidies and equity capital, austria wirtschaftsservice supports companies with the implementation of their innovative projects, especially when the necessary funds cannot be adequately raised through other means. Specific information, advice and services are also offered to prospective, existing and expanding companies.

All these measures are now bearing fruit, creating new and exciting jobs while securing Austria’s future as a hot spot for innovation.

We hope to have captured your attention for the Austrian Life Science Report 2018 where you can read many facts and figures demonstrating the success of the Austrian life science industry and research sector!

Mag.ª Edeltraud Stiftinger
Managing Director Austria Wirtschaftsservice GesmbH

Content

1. Life Science Report Austria 2018
Life Science Sector in Austria

The life sciences have a long history in Austria. This tradition forms the basis of a dynamic scene of researchers, clinicians and entrepreneurs. Today, an excellent network of renowned academic institutions, global players, family-owned businesses and innovative start-ups has been established and ties between science and industry have been strengthened 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 917 companies active in biotechnology, pharma or the medical devices business, life sciences are an important and constantly growing part of the Austrian economy. Eleven percent more businesses were located in Austria in 2017 compared to 2014. In 2017, these companies were responsible for a turnover of 22.4 billion euros. From 2014, revenues increased quite substantially by 17.2%. The life science companies also employ a large chunk of the Austrian workforce. In 2017, more than 55,000 people earned a living working for an Austrian life science company, which means an increase of 7.4% compared to 2014.

The life science industry in Austria is fully diversified and essentially consists of two equally important subsegments: biotechnology and pharma on the one hand, and medical devices on the other. Although there are more companies in the medical device sector (554 companies) than in the biotech and pharma sector (363 companies), both employ a similar number of people. In terms of turnover, biotechnology and pharma is the stronger field with revenues of 13.97 billion euros in 2017, while the turnover in the medical devices industry was at 8.44 billion euros. In conclusion, the key figures show that the life sciences are an important pillar of 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 established itself as an outstanding driver of economic growth and innovation and a creator of jobs.

Strong foundation in research and teaching

The healthy economic development of the life sciences is supported by a dense network of internationally renowned research and teaching expertise. A total of 55 institutions are fully dedicated to life science research or have significant activities in this field. Altogether, more than 21,000 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-trained people, representing a strong pillar in the country's educational system. In 2017, the total number of life science students at universities and universities of applied science accounted to more than 67,000, and close to 7,750 students graduated.

The information in this brochure is the result of a survey conducted by BIOCOM AG between February and May, 2018 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
Number of companies in the life science industry	723	823	917
Number of employees in the life science industry	50,180	51,660	55,480
Turnover in the life science industry	EUR 17.73 bn	EUR 19.11 bn	EUR 22.4 bn
Number of research and education institutions active in life sciences	n.a.	55	55
Number of life science employees in research and education institutions	n.a.	19,830	21,145

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

Map of the Life Science Sector
Distributed According to Federal States

Number of life science companies

1–49
50–99
100–149
≥150

Number of employees in life science companies

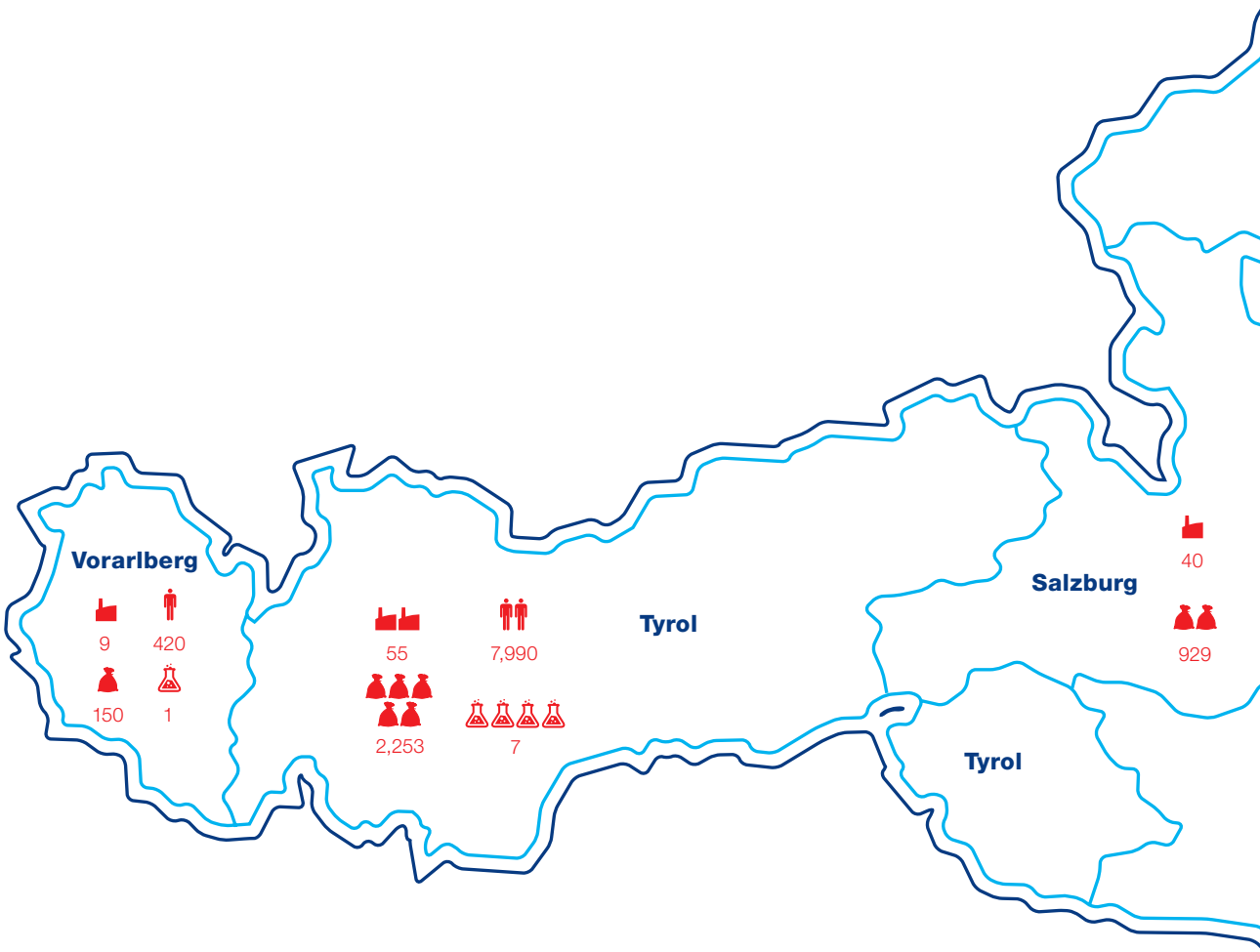
1–4,999
5,000–9,999
10,000–14,999
15,000–19,999
≥20,000

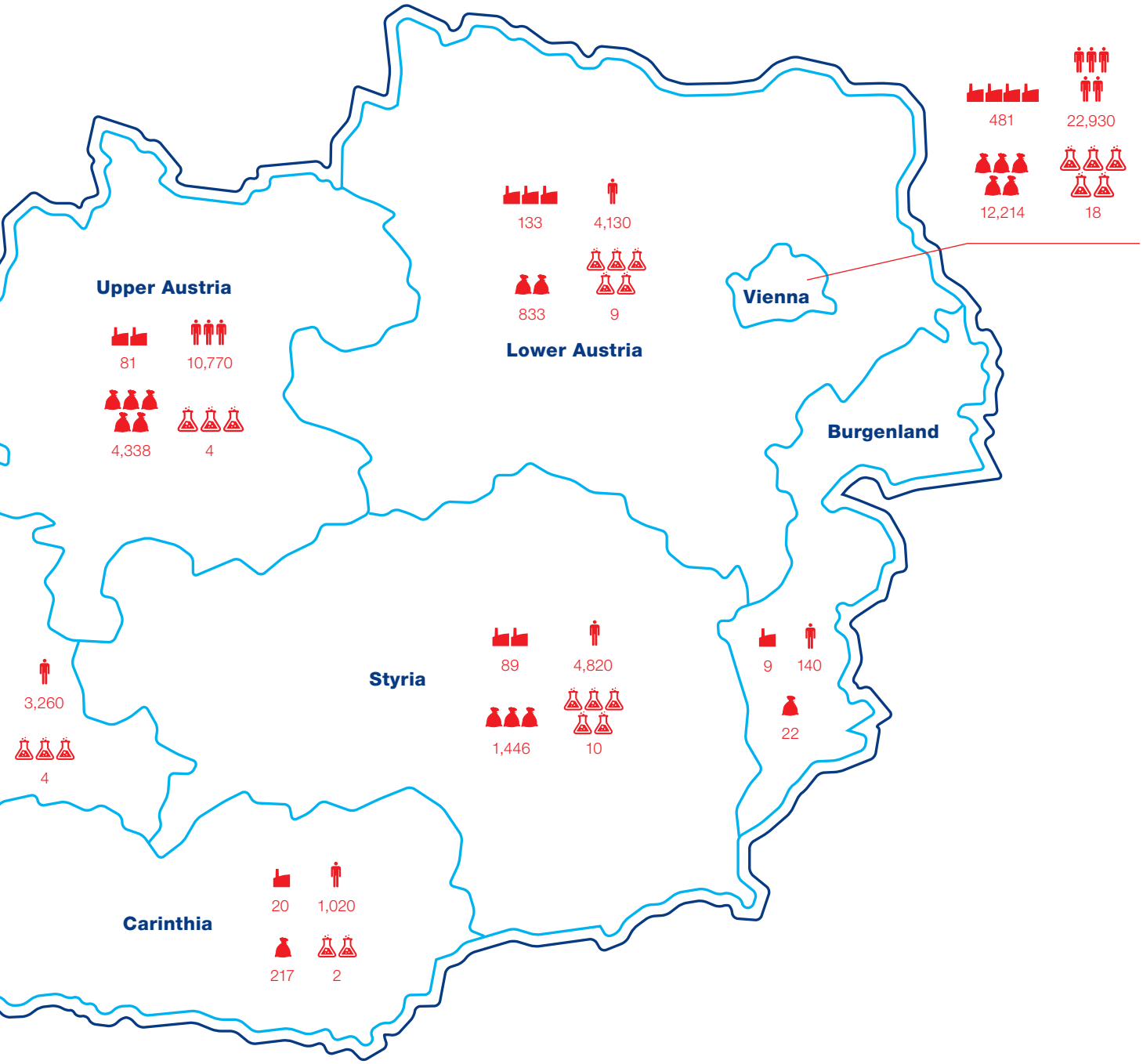
Turnover of life science companies (in € m)

1–499
500–999
1,000–1,499
1,500–1,999
≥2,000

Number of research and education institutions active in life sciences

1
2–3
4–5
6–7
≥8




481
22,930
12,214
18
133
4,130
833
9
Lower Austria
Vienna
Upper Austria
81
10,770
4,338
4
Burgenland
89
4,820
1,446
10
Styria
9
140
22
3,260
4
20
1,020
217
2
Carinthia

2. Biotechnology and Pharma in Austria
Overview

With a growing life expectancy and advancing globalization, society faces new challenges. Among the sectors best suited to help tackle these challenges is biotechnology and pharma. Within Europe, Austria has established a solid position. The central geographical position of the country, combined with the highly skilled staff available in Austria as well as 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 a pivotal role in developing the medicine of the future, be it a treatment for infectious diseases, vaccines or diagnostic tools. The Austrian biotechnology and pharma sector forms a hub for the whole continent and acts as an interface between east and west.

Solid growth for biotech and pharma companies

The Austrian biotechnology and pharma industry continues to grow steadily. In the last three years, the number of companies in the biotechnology and pharma sector has grown by 27. The dynamic rate of growth confirms the significance of biotechnology and pharma in Austria. With revenues exceeding 14 billion euros, the sector continues to be a significant economic factor and a driver for innovation in the healthcare field.

According to the survey, a total of 363 companies are active in the fields of biotechnology and pharma – an increase of 8% compared to 2014. This figure includes the 207 'research, development or manufacturing companies' that consist of 'dedicated biotechnology companies', 'other biotechnology active' and 'pharma companies' (for definitions, see page 47) and the 156 specialized service providers, suppliers, and sales and distribution companies (for methodology, see page 45).

The 363 biotechnology and pharma companies generated a total turnover of 13.97 billion euros in 2017, an increase of 20% compared to 2014. With revenues of 9.34 billion euros, the research, development and manufacturing companies contributed about twice as much as the supply, service and sales companies (4.63 billion euros) – a shift that is at least partly due to a change in methodology. For the first time in 2017, subsidiaries of the companies whose purpose is not only the distribution of products, but also the preparation and monitoring of clinical trials, are included as research, development and manufacturing companies. In past surveys, they were counted as sales companies.

In 2017, the majority of staff employed by the biotechnology and pharma companies worked in the research, development or manufacturing companies: 23,080 of the 28,850 people earned their living in this field. Supply, service and sales companies had 5,770 employees. These figures illustrate the dynamic 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
Number of companies in the biotechnology and pharma sector	288	336	363
Research, development, manufacturing companies*	157	175	207
Other companies (suppliers, service providers, sales companies)	131	161	156
Number of employees in the biotechnology and pharma sector	25,190	26,500	28,850
Employees in research, development, manufacturing companies*	18,057	18,480	23,080
Employees in other companies (suppliers, service providers, sales companies)	7,133	8,020	5,770
Turnover in the biotechnology and pharma sector	EUR 10.33bn	EUR 11.65 bn	EUR 13.97 bn
Turnover of research, development, manufacturing companies*	EUR 5.11bn	EUR 5.72 bn	EUR 9.34 bn
Turnover of other companies (suppliers, service providers, sales companies)	EUR 5.22bn	EUR 5.93 bn	EUR 4.63 bn

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

** dedicated, other biotechnology active, pharma companies*

Map of the Biotechnology and Pharma Sector
Distributed According to Federal States

Number of companies in the biotechnology and pharma sector

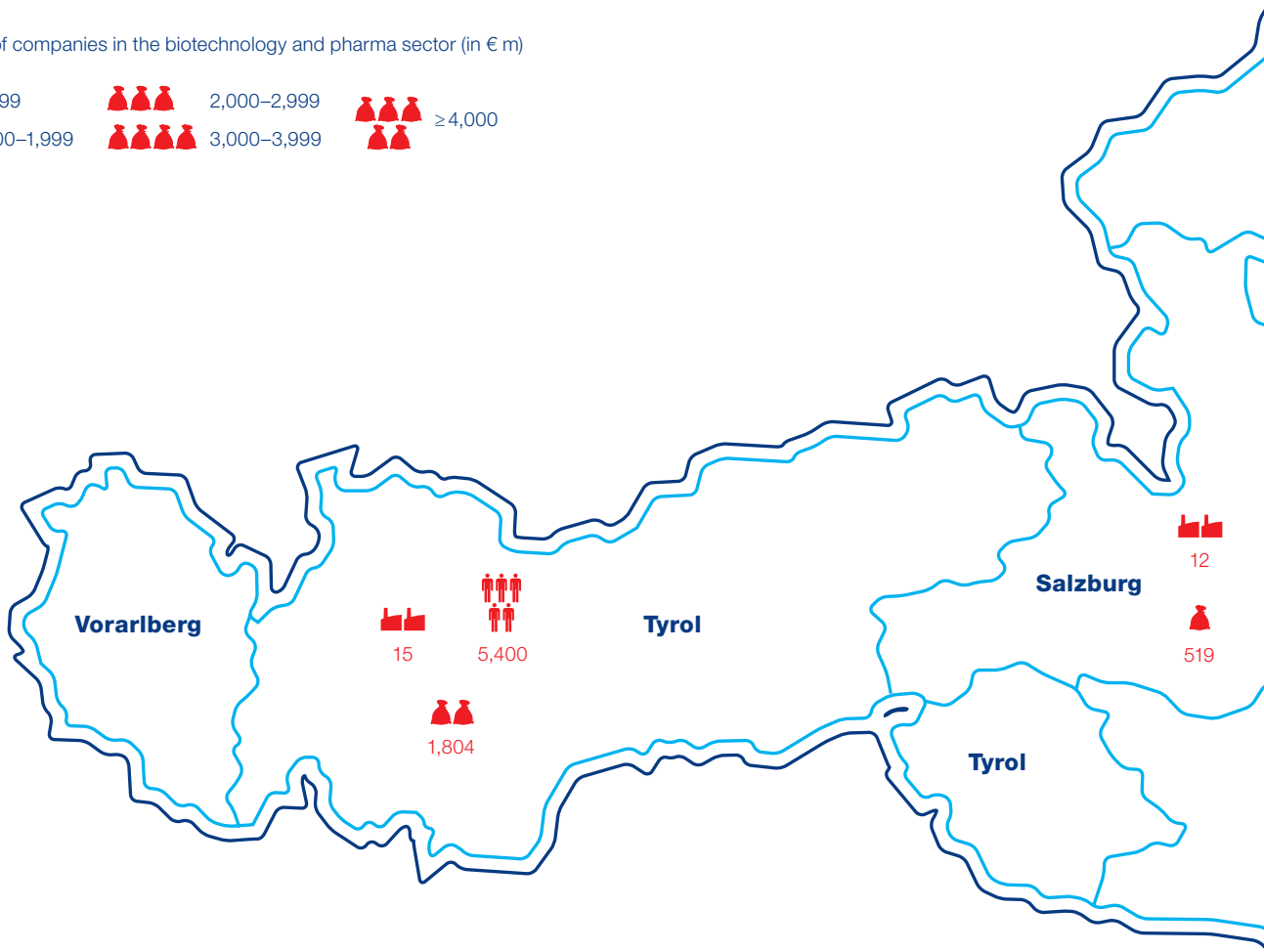
1–9
10–19
20–29
30–39
≥40

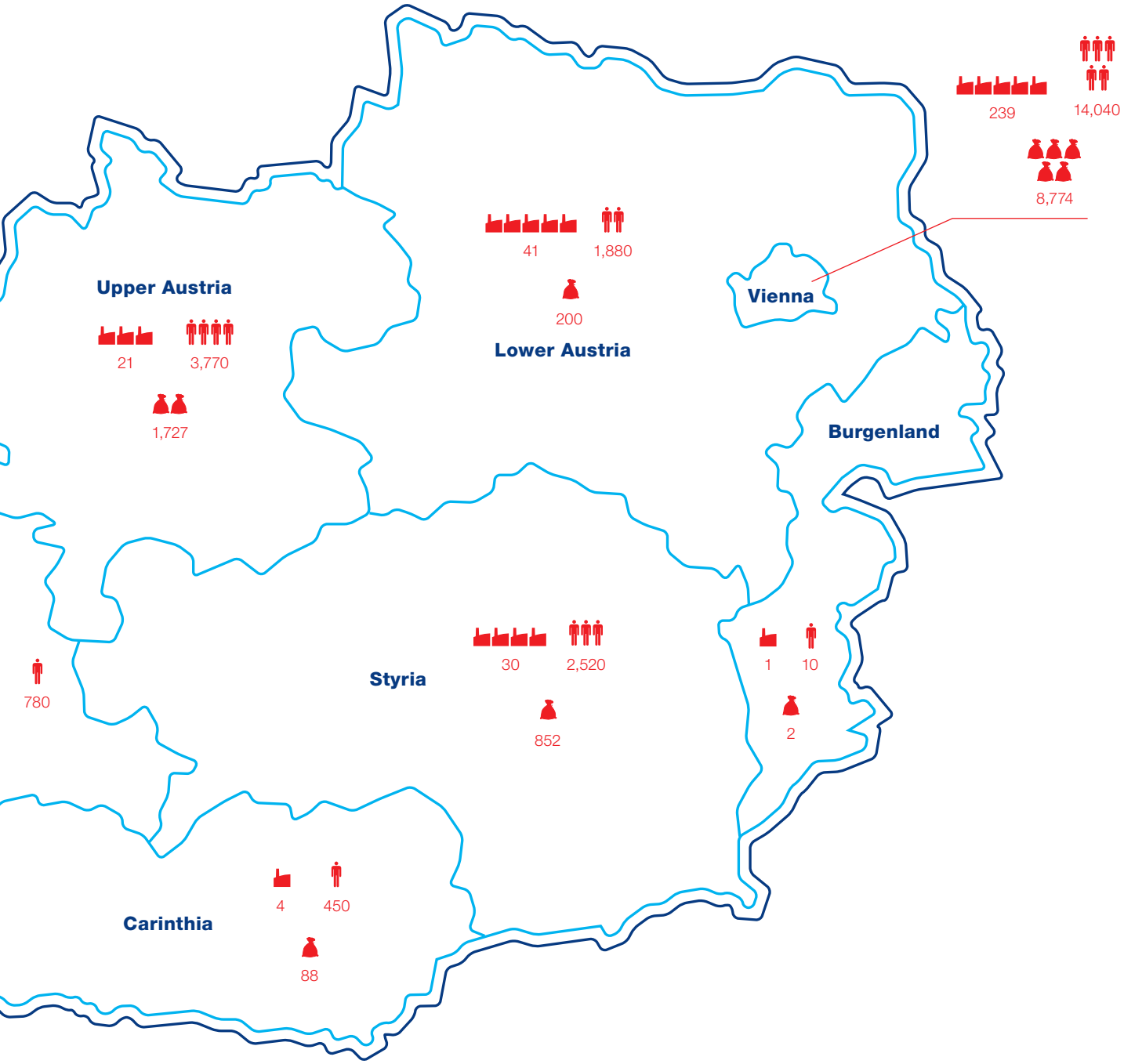
Number of employees in the biotechnology and pharma sector

1–999
1,000–1,999
2,000–2,999
3,000–3,999
≥4,000

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

1–999
1,000–1,999
2,000–2,999
3,000–3,999
≥4,000




239
14,040
8,774
41
1,880
200
Lower Austria
Vienna
Upper Austria
21
3,770
1,727
Burgenland
780
Styria
30
2,520
852
1
10
2
Carinthia
4
450
88

2.1 Dedicated Biotechnology Companies
Structure and Employees

The biotechnology sector in Austria continues to thrive. Still, all of the key economic figures such as company and employee numbers and turnover clearly improved from 2014 until 2017, demonstrating the solid health of the sector. The crucial aspect of financing has recorded quite a substantial increase: biotech companies could raise more than triple the capital from previous years (see figure 5, page 20).

In 2017, there were 127 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 Organisation for Economic Cooperation and Development (OECD). This is a substantial increase (+9.5%) to the last survey in 2014. Compared to 2010, the sector has nearly doubled in size: seven years ago, only 77 dedicated biotech companies existed in Austria.

Twenty-nine start-ups sprung up since 2014; twelve became operative in 2015, ten in 2016 and seven in 2017. 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 eight years old. For comparison: only 15 companies 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 2017, a total of 1,830 employees worked for dedicated biotechnology companies. This is 10.2% more than in 2014 (1,660 employees) and continues the upward trend (2012: 1,565 employees; 2010: 1,470 employees).

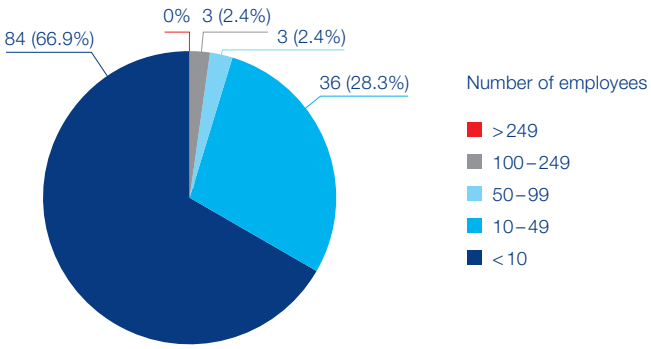


Figure 1: Size structure of dedicated biotechnology companies in 2017

A 55 percent share of these employees were female, a value that has remained nearly constant over the last years.

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 (84 firms; 66.9%) have less than ten staff. In 2014, the share of very small companies was somewhat lower: With 71 companies, only 61.2% of dedicated biotechs had ten employees or fewer.

Almost thirty percent belong to the second smallest company size: 36 companies have between ten and 49 persons on their payroll (28.3%). Larger dedicated biotechnology companies are the exception in Austria. To date, six firms have reached this size. Three companies employ a staff of 50 to 99, three more have 100 to 249 employees on its payroll (2.4%, respectively).

	2010	2012	2014	2017
Number of dedicated biotechnology companies	77	95	116	127
Number of employees in dedicated biotechnology companies	1,470	1,565	1,660	1,830
Turnover of dedicated biotechnology companies	EUR 161 m	EUR 187.2 m	EUR 198 m	EUR 312.6
R&D expenditure of dedicated biotechnology companies	EUR 173 m	EUR 131.8 m	EUR 143.6 m	EUR 170.8
Financing of dedicated biotechnology companies	EUR 79 m	EUR 98.1 m	EUR 86.8 m	EUR 289.5

Table 3: Key figures of dedicated biotechnology companies 2010, 2012, 2014, 2017

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 in this survey.

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 2017, 85 of the 127 dedicated biotech companies (66.9%) in the country operated in this field, focussing on a wide range of different indications (see table 4, page 18).

Companies in the field of industrial biotechnology are dedicated to the development of new technical enzymes, new biomaterials and new biotechnological production processes. In 2017, 14 Austrian companies (11%) were active in this field (2014: ten 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 6, page 22).

Bioinformatics – collecting and analyzing big data using information technologies – is a growing field. In 2017, five Austrian firms (3.9%) belonged to this category - up from three companies in 2014, when it was included in the report for the first time.

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 2017, only three Austrian companies (2.4%) 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 an own in-house development activities is also attributed to this category. With 20 companies (15.7%) in 2017, it is still the second largest segment of the Austrian biotechnology sector. However, the number of companies providing non-specific applications has dropped by 20% since 2014 (24 companies).

Reflecting the sector as a whole, most of the start-up companies which became active since 2014 have focused their business models on health-related biotechnology (23 companies). Non-specific applications (two companies), industrial biotechnology (1 company), bioinformatics (2 companies) and agricultural biotechnology (1 company) have played a minor but notable role.

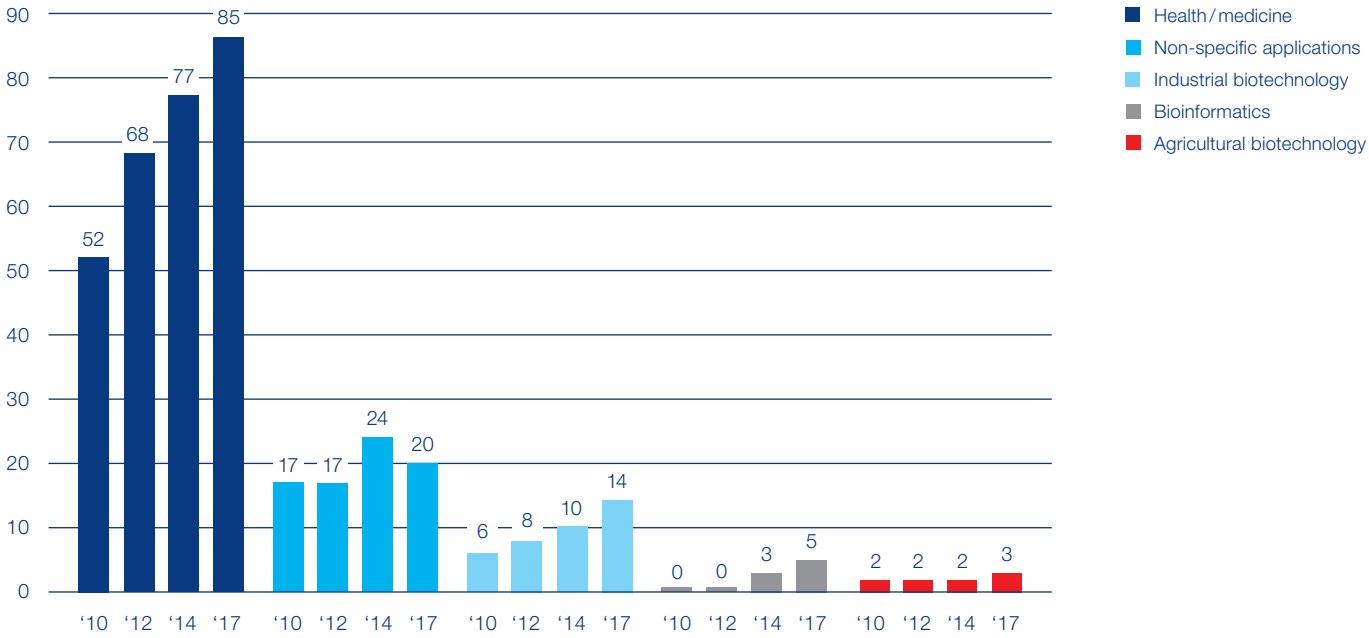


Figure 2: Main areas of activity in dedicated biotechnology companies 2010, 2012, 2014, 2017

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 2017, the 85 Austrian dedicated biotechnology companies had a total of 92 compounds in preclinical development, or in one of the three phases of clinical development. In 2012, 68 companies focused on 92 hopefuls, and in 2010, 52 firms had 80 candidates in the pipeline. However, compared to 2014, when 77 companies had 97 compounds in the pipeline, the current numbers mark a slight decrease of 5.1%.

However, the number of biopharmaceutical substances has increased. In 2017, there are 67 such compounds in the pipeline (2014: 65), making up three quarters of all drug candidates. Only 25 drugs were small molecules (2014: 32). 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 2017, a total of 45 biopharmaceutical candidates and 18 small molecules were in this early development stage. Twenty-two biotherapeutic agents and seven 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 four products on the market. This number is not likely to change soon, as there are currently no products in the approval process.

Biopharmaceutical development projects matured

Over the years, the pipeline has constantly matured. In 2017, a total of 13 compounds were tested in clinical phase I trials (ten biomolecular agents, three small molecules). Thirteen additional drug candidates were in phase II, of which eleven were biotherapeutic agents. One biopharmaceutical drug candidate and two small molecule compounds 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.

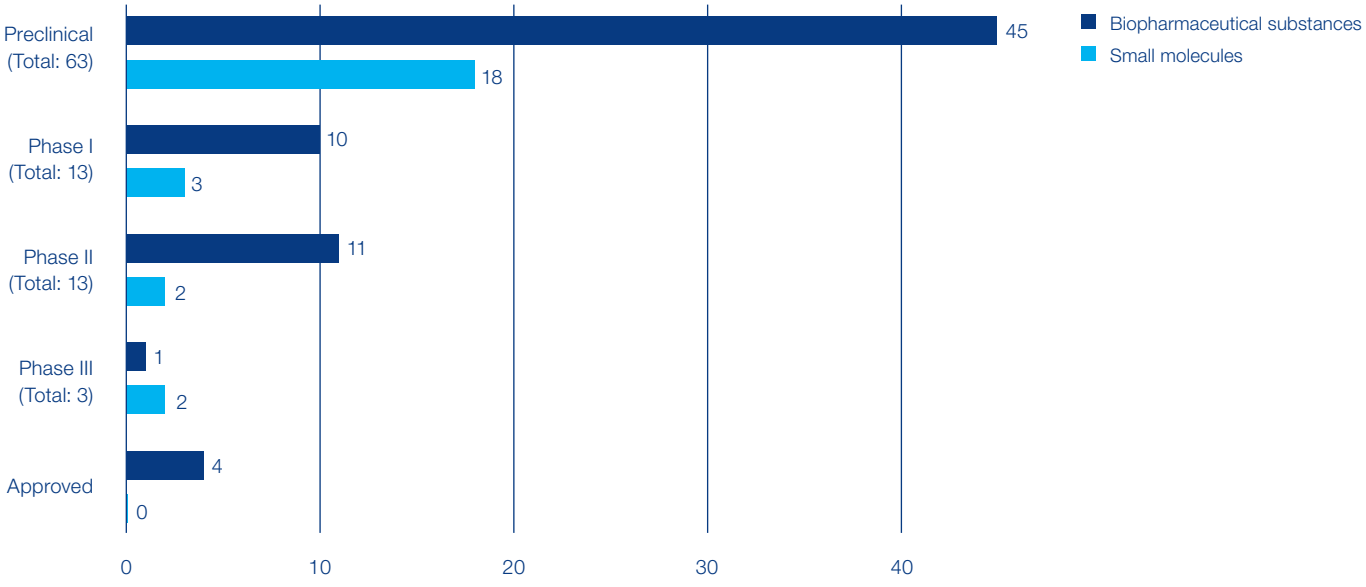


Figure 3: Drug candidates of dedicated biotechnology companies in 2017

Company	Drug candidate	Indication
Phase I		
AFFiRiS AG	PD01 PCSK9	Parkinson's disease Lipid lowering
Apeiron Biologics AG	APN401	Various tumors
F-star Biotechnologische Forschungs- und Entwicklungs GmbH	FS102	Solid tumors
F4 Pharma	FX06	Lung, kidney and liver transplantation; circulatory shock
Hookipa Biotech AG	HB-101	Cytomegalovirus (CMV)
Marinomed Biotechnologie GmbH	Mavirex Zanamivir combination Marinosolv/Budesolv	Seasonal influenza Allergic rhinitis
NABRIVA Therapeutics AG	BC-7013	Uncomplicated skin and skin structure infections (uSSSI)
Panoptes Pharma Ges.m.b.H.	PP-001	Uveitis
Recardio	REC-01	Acute myocardial infarction
Themis Bioscience GmbH	MV-ZIKA	Zika virus
Valneva Austria GmbH	VLA15	Lyme disease
Phase II		
Apeiron Biologics AG	APN01 APN301	Acute respiratory distress syndrome (ARDS) Neoblastoma
APEPTICO Forschung und Entwicklung GmbH	AP318	Pseudohypoaldosteronism
Arsanis Biosciences GmbH	ASN100	Staphylococcus aureus
Biomay AG	BM32	Grass pollen allergy
Biomedizinische Forschungsgesellschaft m.b.H.	rTSST-1v	Toxic shock syndrome
EURRUS Biotech GmbH	XC-8	Asthma
Innovacell Biotechnologie AG	ICEF15	Faecal incontinence
Themis Bioscience GmbH	MV-CHIK	Chikungunya virus
Valneva Austria GmbH	VLA84	Clostridium difficile
Viravaxx AG	VXX001	Hepatitis B
Vivaldi Biosciences AG	delta FLU LAIV	Influenza
Zytoprotec	PD-protec	Peritoneal dialysis
Phase III		
APEPTICO Forschung und Entwicklung GmbH	AP301	Acute lung injury
Innovacell Biotechnologie AG	ICES13	Stress urinary incontinence (SUI)
NABRIVA Therapeutics AG	Lefamulin (BC-3781)	Bacterial infections
Approved		
Apeiron Biologics AG	Qarziba	High-risk neuroblastoma
Marinomed Biotechnologie GmbH	Carragelose	Common cold and flu-like illnesses
Valneva Austria GmbH	IXIARO DUKORAL	Japanese encephalitis Cholera

Table 4: Drug candidates of dedicated biotechnology companies in clinical phase I till approval in 2017

Drugs for the treatment of infectious or parasitic diseases play the biggest role. Twenty-eight companies (32.9%) had ongoing development programs in this indication in 2017. Thus, roughly a third of all Austrian dedicated biotechnology companies with activities in the health sector belong to this category. Antibiotics were in particular interest to start-ups: two of the newcomers develop antiinfective medicines.

The second important group are companies with a focus on cancer treatments. A total of 17 companies (20%) 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 15 Austrian biotechs (17.6%). According to the ICD-10 classification scheme, many anti-allergy drugs are classified as treatments for diseases of the respiratory system. Thirteen companies (15.3%) are developing drugs against diseases of the skin and subcutaneous tissue. Another large number of companies concentrate on diseases of the blood and immune system. Eleven companies (12.9%) have initiated clinical programs in this indication. Other relevant areas of research include endocrine, nutritional and metabolic diseases (10 companies, 11.8%), diseases of the musculoskeletal system and connective tissue (9 companies, 10.6%), diseases of the digestive system and diseases of the genitourinary system (8 companies each, 9.4%). In 2017, four Austrian dedicated biotechnology companies (4.7%) had active ingredients under development for the treatment of diseases of the nervous system. Two companies (2.4%) worked on cures for diseases of the eye and the adnexa, another two companies (2.4%) are working on drugs dealing with pregnancy, childbirth and the puerperium. One company (1.2%) is focusing on diseases of the ear and the mastoid process.

Indications according to ICD-10	Number of companies	Percentage
Certain infectious and parasitic diseases	28	32.9%
Neoplasms	17	20%
Diseases of the respiratory system	15	17.6%
Diseases of the skin and subcutaneous tissue	13	15.3%
Diseases of the blood and immune system	11	12.9%
Endocrine, nutritional and metabolic diseases	10	11.8%
Diseases of the musculoskeletal system and connective tissue	9	10.6%
Diseases of the circulatory system	8	9.4%
Diseases of the digestive system	8	9.4%
Diseases of the genitourinary system	7	8.2%
Diseases of the nervous system	4	4.7%
Diseases of the eye and the adnexa	2	2.4%
Pregnancy, childbirth and the puerperium	2	2.4%
Diseases of the ear and the mastoid process	1	1.2%

Table 5: Overview of indications in the focus of medical biotechnology companies in 2017

2.1 Dedicated Biotechnology Companies
Turnover and R&D Expenditure

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 2017, the 127 Austrian dedicated biotechnology companies had a combined revenue of 312.6 million euros, which means a plus of 58 % when compared to 2014 (198 million euros).

Biotechnology turnover in the health sector passed 200 million euros

The most significant growth has taken place in the health related areas of biotechnology. With 203.6 million euros, turnover of these companies increased by 58.6% compared to 2014 (128.4 million euros) and has passed the 200 million euro mark for the first time – which is even more impressive when considering the long development times in this sector. However, the young sector can already boast four 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 35 million euros in 2017, the figures increased by 17.4% compared to 2014 (29.8 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.

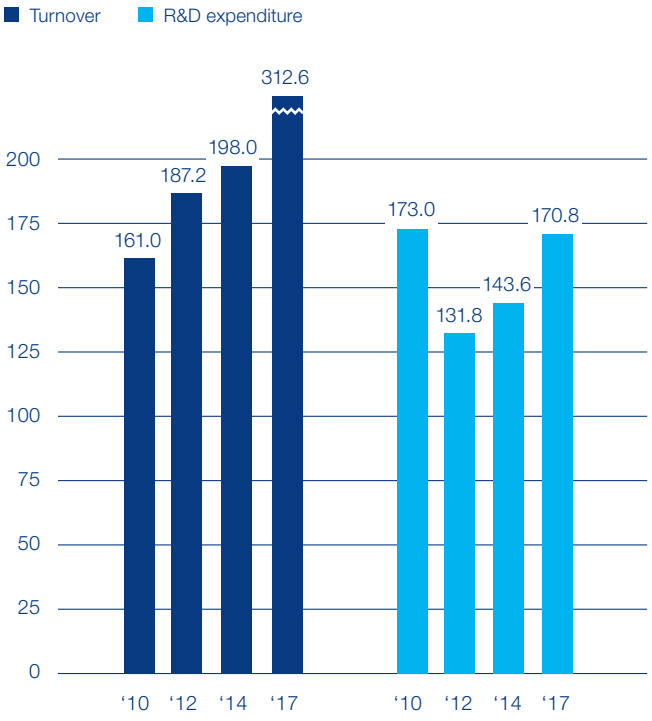
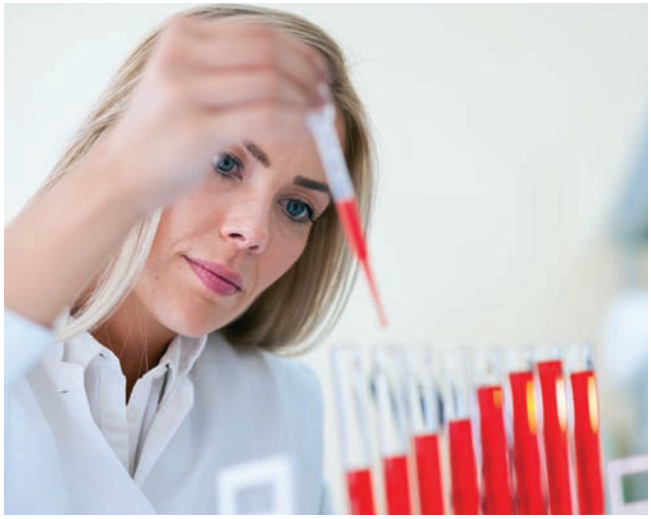


Figure 4: Turnover and R&D expenditure (both in € m) of dedicated biotech companies 2010, 2012, 2014, 2017



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 2017, these companies generated revenues of around 71.4 million euros, accounting for 22.8% of total turnover among the dedicated biotechnology companies. Compared to 2014, when the companies generated 38.4 million euros of turnover, the figure increased by 85.9%.

Half 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 the market. This is highlighted by the 170.8 million euros – more than half of turnover (54.6%) – invested in R&D by dedicated companies in 2017. R&D expenditure has experienced significant growth and has again reached the level of 2010.

Given the high costs associated with the development of new drugs, the largest sums by far are invested in health related projects. In 2017, this area alone accounts for 156.1 million euros of R&D spending (2014: 132.5 million euros). Three fourths of turnover was reinvested into R&D in this segment. Firms with non-specific activities lag far behind with a R&D budget of about 8.5 million euros (2014: 6.6 million euros). Industrial biotechnology companies invested 5.5 million euros in R&D projects (2014: 4.2 million euros).

2.1 Dedicated Biotechnology Companies
Financing

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.

Tremendous interest from VC investors and stock markets

In terms of financing, 2017 was an exceptionally good year for Austrian dedicated biotechnology companies. They managed to secure a total of 289.5 million euros. This is more than three times the amount raised in 2014 (86.8 million euros). Financings through venture capital and private equity, in particular, went through the roof: Austrian biotechs were able to raise 137.4 million euros this way. The tremendous interest from VC investors more than tripled the amount of money raised. In 2014, they supplied 41.6 million euros. Another big chunk of capital came from the stock markets. Fifty-one million euros came from a single 2017 IPO while investment in public equity brought in another 67 million euros. Another major IPO had already flushed 94 million euros into the sector in 2015, bringing the number of publicly listed Austrian biotechs to three. By and large, stock markets are still playing a minor part for the sector. Nonetheless, this illustrates that they can be a viable source of capital for biotech companies.

The engagement of private investors and business angels in the Austrian biotech sector is subject to high fluctuations. In 2017, 15.4 million euros came from these sources – 24.2% more than in 2014 (12.4 million euros). Companies reported 15 million euros of fundings from federal and state resources in 2017. However, only a fifth of all companies provided this information. According to public figures, public funding into Austrian life science companies amounted to more than 44 million euros in 2017 alone. Additionally companies can take advantage of governmental tax incentives such as the Forschungsprämie, which gives Austrian firms a 14% refunding for R&D expenses.

Two funding sources also netting lower amounts than in previous years were loans (3.5 million euros as compared to 5.5 million in 2014) and unspecified forms of financing (0.2 million euros; 2014: 2.8 million). However, even combined, these two forms of financing only constitute a slim fraction of all capital raised (1.3%).

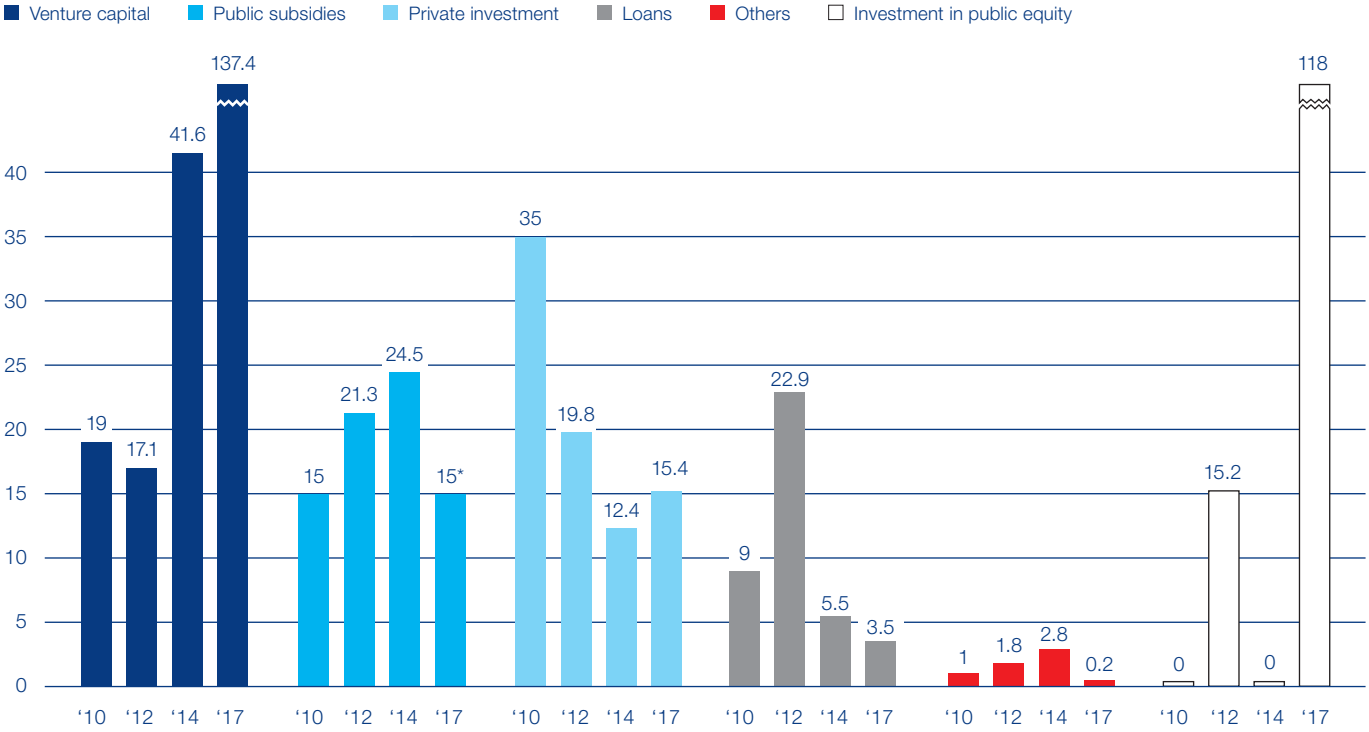


Figure 5: Sources of financing for dedicated biotechnology companies 2010, 2012, 2014, 2017 **information provided by only 20% of the companies*

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 2010, 2012, 2014 and 2017 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.

Overall improvement of 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 2010. 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 larger growth in number of companies and employees, the Austrian sector can boast the greater increase in turnover and R&D expenditure for the last three years.

While the German biotech sector recorded growth rates of less than 5% between 2010 and 2012 and also between 2012 and 2014, both the number of companies and the number of employees exploded between 2014 and 2017 (a plus of 11.6% and 21.9%, respectively). In comparison, the number of biotech companies in Austria "only" grew by 8.6%, and the number of employees by 10.2%. Regarding turnover and R&D expenditure, the data paint a different picture. Although German dedicated biotechnology companies also made 32.4% more revenue in 2017 than in 2014, they could not top the 58% growth of their Austrian counterparts.

Dedication to research & development

Strong commitment to research has long been a particular strength of the Austrian biotech sector. In 2017, the companies spent 19.5 euros per capita on research and development (up from 16.9 euros per capita in 2014); in Germany, this figure is 13.5 euros (2014: 11.7 euros). In total, Austrian biotechs spent 171 million euros on R&D, which is an increase of 18.8%. 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 2017, 26% 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 neighbour, can still hold its own when it comes to economic growth in the biotechnology sector.

	2010		2012		2014		2017	
	Germany*	Austria	Germany*	Austria	Germany*	Austria	Germany*	Austria
Number of companies	538	77	565	95	579	116	646	127
Number of employees	15,480	1,470	17,430	1,565	17,930	1,660	21,860	1,830
Turnover	EUR 2,376m	EUR 161m	EUR 2,903m	EUR 187m	EUR 3,032m	EUR 198m	EUR 4,105m	EUR 313m
R&D expenditure	EUR 1,015m	EUR 173m	EUR 934m	EUR 132m	EUR 954m	EUR 144m	EUR 1,117m	EUR 171m

Table 6: Key figures of German and Austrian dedicated biotech companies 2010, 2012, 2014, 2017

** 'The German Biotechnology Sector' (2010, 2012, 2014, 2017); BIOCOM AG*

2.2 Other Biotechnology Active Companies
Structure, Employees, Fields of Activity and Turnover

Alongside dedicated biotechnology companies, Austria is home to a wide range of companies that do not focus on biotechnology exclusively. 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: 80% of the companies have significant activities in this sector. Another 13.3% have capacities in the industrial biotechnology area, and 6.7% in agricultural biotechnology.

Notable increase partly due to methodology change

In 2017, there were 45 companies in Austria that count biotechnological activities as an aspect of their business. This is an increase of two thirds compared to 2014, when 27 companies belonged to this group. The massive increase can in part be explained by a change in methodology: 19 companies were reassigned to "other biotech companies" that had previously been classified as "sales and distribution companies". These companies conduct clinical studies but are otherwise mainly active in sales (see methodology on page 45 ff.).

The 45 companies employed in total 17,650 people, up from 13,720 employees in 2014. This represents a plus of 28.6%. 57% of staff were female. Total workforce primarily concerned with biotechnology in the companies rose from 5,970 employees in 2014 to 7,100 employees in 2017, representing 40% of the total staff. In contrast to the dedicated biotech sector, this segment is dominated by big employers: there were eleven companies that have more than 249 employees on their books (24.5%), and another 15 that have more than 100 employees (33.3%). In addition, there were eight medium-sized companies (50–99 employees; 17.8%) and nine small companies with less than fifty employees. Only two companies (4.4%) had less than ten staff.

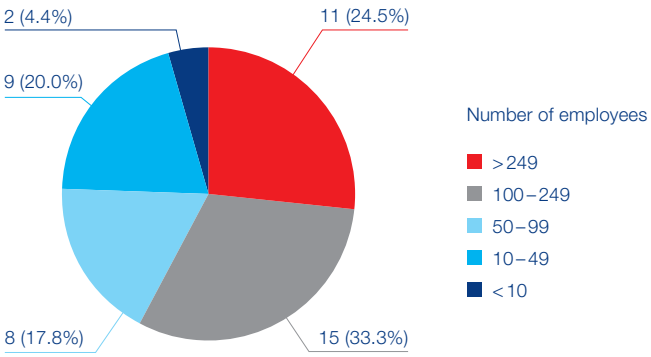


Figure 6: Size structure of other biotechnology active companies in 2017

Turnover increased

The turnover of companies active in the category described here has nearly doubled since 2014. Other biotechnology active companies generated a turnover of 7.6 billion euros – an increase of 72% when compared to 2014 (4.4 billion euros). It should be kept in mind that a big chunk of this increase can be traced back to the methodology update mentioned above. However, even when substracting the reclassified companies, other biotech companies still boomed. Although company numbers declined slightly, both staff numbers and turnover increased markedly.

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 substantially. In 2014, Austria-based companies in the category "other biotechnology active" invested the amount of 783 million euros into R&D activities – 46.6% more than in 2014, when R&D expenditure reached 534 million euros.

	2010	2012	2014	2017
Number of other biotechnology active companies	36	33	27	45*
Number of employees in other biotechnology active companies	12,120	13,790	13,720	17,650*
Number of employees in the biotech-related areas of other biotechnology active companies	5,810	5,890	5,970	7,100*
Turnover of other biotechnology active companies	EUR 2.87bn	EUR 3.88bn	EUR 4.43bn	EUR 7.59bn*
R&D expenditure of other biotechnology active companies	n.a.	n.a.	EUR 534m	EUR 783m*

Table 7: Key figures of other biotechnology active companies 2010, 2012, 2014, 2017

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

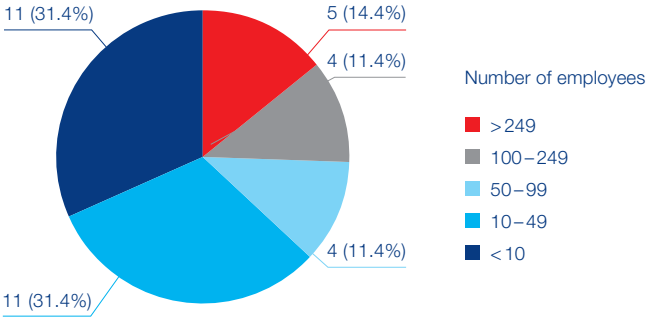


Figure 7: Size structure of pharma companies in 2017

Small firms shape the industry

In 2017, a total of 35 companies were active in the pharma sector in Austria – an increase of 9.4% compared to 2014 (32 companies). 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). Four companies have up to 100 employees and four more are medium-sized, with up to 250 employees (11.4% each). Five companies have more than 249 people on their payroll and thus belong to the category of big companies (14.4%). In total, the 35 pharma companies provided jobs for 3,600 employees, a plus of 16% compared to 2014 (3,100 employees).

Healthy growth in turnover and R&D expenditure

Pharmaceutical companies prove to be an important contributor to the Austrian economy. In 2017, they generated a turnover of 1.43 billion euros, which represents a substantial increase of 30% compared to 2014 (1.1 billion euros). Even if one were to substract the companies added thanks to the change in methodology described above, pharma companies would be thriving: both employee number and turnover increased considerably.

A noticeable increase has also been recorded in the expenditure into research and development activities. Austrian pharma companies invested 135 million euros in R&D to keep their product pipeline filled. This represents an increase of 23% to the R&D expenditure in 2014 (110 million euros). The increase reflects the growing importance of investments in innovative drug development.

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

Table 8: Key figures of pharma companies 2012, 2014, 2017

** partly also due to change in methodology*

2.4 Suppliers in the Biotechnology and Pharma Sector
Structure, Employees, Fields of Activity and Turnover

To develop a drug and successfully navigate the long route from bench to bedside is a highly complex process. The majority of biotechnology and pharma companies rely on efficient suppliers to divide the wide range of labor needed. This is not only true for the group of companies that already manufactures goods and 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 biotechnology and pharma sector itself. Among their highly diversified product portfolio, suppliers offer:

- 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

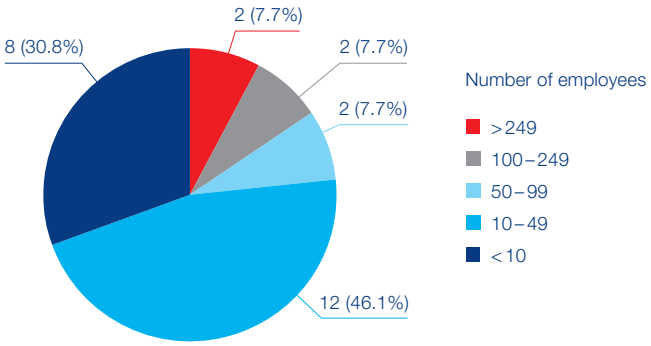


Figure 8: Size structure of suppliers in the biotechnology and pharma sector in 2017

In total, there are 26 companies in Austria dedicated to one of these business activities. Together, they achieved a turnover of 666 million euros in 2017. This represents a 10.3% jump in comparison to 2014, when a total of 24 suppliers achieved a turnover of 604 million euros. Compared to 2012, the number of suppliers has almost doubled (2012: 14 companies), while turnover grew by 38% (2012: 481 million euros). On average, each company generates a turnover of 25.6 million euros.

Small, specialized suppliers dominate the field

A significant part of the biotechnology and pharma job market is related to the supply companies. Taken together, these firms employed a total of 1,860 staff in 2017 – up 4.5% from 2014, when 1,780 people were on suppliers' payroll, and up 36% compared to 1,370 employees in 2012.

Quite a number of small enterprises operate in this segment in Austria. More than three fourths of all suppliers have fewer than 50 employees. Twelve 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 two firms have more than 100 and another two more than 250 people on their books.

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

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

2.5 Service Providers in the Biotechnology and Pharma Sector

Structure, Employees, Fields of Activity and Turnover

Many biotechnology and pharmaceutical companies have to rely on service providers to do work that is not part of their core business. Service providers cover a wide variety of tasks which depend on the customers' needs.

Guidance in 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.

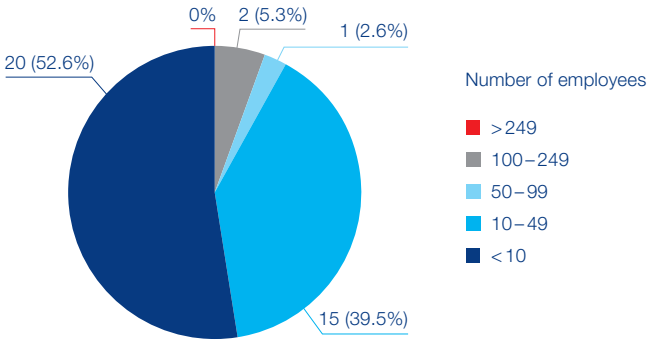


Figure 9: Size structure of service providers in the biotechnology and pharma sector in 2017

More companies, fewer employees

Although it is still a small segment, there are more service providers active in the Austrian biotech and pharma sector established than three years ago. In 2017, there were 38 firms, which is 46% more than in 2014 (26 companies). However, these firms employed a lot less staff than previously. In 2017, 690 persons were working in this segment – a decrease of 21% compared to 2014 (870). Although the number of service providers has grown considerably, their turnover has stayed nearly the same. One hundred million euros were generated by these companies, a little less than in 2014 (103 million euros). This change can be attributed to the closing down of the single large entity in which more than 250 people were previously employed.

Most companies providing services for the biotech and pharmaceutical industry are relatively small. Twenty companies (52.6%) only employ up to nine staff. The fifteen next largest companies (39.5%) operate with a staff of more than ten but less than 50. There is one company with less than 100 employees in the service sector, and two firms that have more than 100 but less than 250 members of staff. As mentioned above, there is no longer a large-scale enterprise with more than 250 employees among the service providers.

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

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

2.6 Sales and Distribution Companies in the Biotechnology and Pharma Sector
Structure, Employees and Turnover

Sales and distribution are important functions 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, companies involved with clinical studies are no longer listed in this section. Almost two dozen companies that were previously categorized as "sales and distribution" have thus been reassigned to other segments. For more information, please see methodology, page 47.

Significant economic contributions

Its unique geographical location in the heart of Europe makes Austria an ideal location for sales and distribution. Several globally active pharma or biotechnology companies have established sales and distribution subsidiaries here for this reason. The Austrian-based offices are often used to penetrate not only the Austrian 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 2017, there were a total of 92 sales and distribution offices specialized in biotechnology and pharma operating across Austria. The aforementioned change in methodology caused the numbers to drop by almost 20% (2014: 111 companies). With the lower number of companies comes a reduced number of staff: 3.220 employees worked in this segment in 2017. Thus, with regard to the job market, the sales and distribution sector still plays an important role in the biotech and pharma business. Compared to the 2014 workforce of 5,370 in this sector, however, this constitutes a decrease of 40%.

The turnover of the 92 Austrian sales and distribution offices specialized in biotechnology and pharma aggregated to 3.86 billion euros. Although this constitutes a drop of around a third, sales and distribution companies still make quite a significant economic contribution. The impact of the change in methodology is quite striking. If the change were disregarded, sales and distribution companies in the biotech and pharma sector would have registered a significant growth, instead. Both number of companies and employees would have increased, with turnover even growing by almost 20%.

Strong focus on medical biotechnology and pharmaceuticals

The specific fields of activity for sales and distribution companies are highly diversified, which is not unusual for this sector in general. The range extends from fairly simple products – for example cough syrup, which has been based on the same recipe for decades – to highly complex high-tech products, such as advanced cancer treatments 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.

	2012	2014	2017
Number of sales and distribution companies in the biotechnology and pharma sector	103	111	92*
Number of employees in sales and distribution companies in the biotechnology and pharma sector	4,980	5,370	3,220*
Turnover of sales and distribution companies in the biotechnology and pharma sector	EUR 4.65bn	EUR 5.22bn	EUR 3.86bn*

Table 11: Key figures of sales and distribution companies in the biotechnology and pharma sector 2012, 2014, 2017

**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 2018, Austria spent about 10.4% of its GDP in 2016 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.

Medical device industry continues 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 274 public and private hospitals in the country. A CE marking ('Communauté Européenne') and compliance with the Medical Devices Act ('Medizinproduktegesetz') 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 health care. In spite of a remarkable number of long-established companies, the sector has seen tremendous growth in recent years – a trend that continued in 2017.

Growth spurt: 554 companies generate 8.44 billion euros

In 2017, a total of 554 companies were active in the Austrian medical device industry. This marks an increase of 14% compared to 2014 (487 companies). As in the previous reports, the information collected on these companies was based on Global Medical Device Nomenclature (GMDN) guidelines.

Among the 554 medtech companies, there are 171 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 132 such companies recorded in 2014, this is a significant increase of 30%. Another major part of the medical device business in Austria are suppliers, service providers and sales companies. Their number has also increased since 2014: While there were 355 such companies in 2014, there were 383 in 2017.

With a workforce of 26,630 employees, the medical device industry is an increasingly important pillar in the Austrian job market. In 2017, the combined turnover of all companies in the field was at 8.44 billion euros – 13% more than in 2014. 2.69 billion euros of this was generated by the research, development or manufacturing companies, and 5.75 billion euros by the suppliers, service providers and sales companies. These numbers show a strong economic power of the medical devices industry in Austria.

	2012	2014	2017
Number of companies in the medical device sector	435	487	554
Research, development, manufacturing companies*	136	132	171
Other companies (suppliers, service providers, sales companies)	299	355	383
Number of employees in companies related to medical device	24,990	25,160	26,630
Employees in research, development, manufacturing companies*	7,156	7,200	8,760
Employees in other companies (suppliers, service providers, sales companies)	17,834	17,960	17,870
Turnover of all companies related to medical device	EUR 7.40 bn	EUR 7.46 bn	EUR 8.44 bn
Turnover of research, development, manufacturing companies*	EUR 2.26 bn	EUR 2.32 bn	EUR 2.69 bn
Turnover of other companies (suppliers, service providers, sales companies)	EUR 5.14 bn	EUR 5.14 bn	EUR 5.75 bn

Table 12: Key figures of the medical device sector 2012, 2014, 2017

** 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

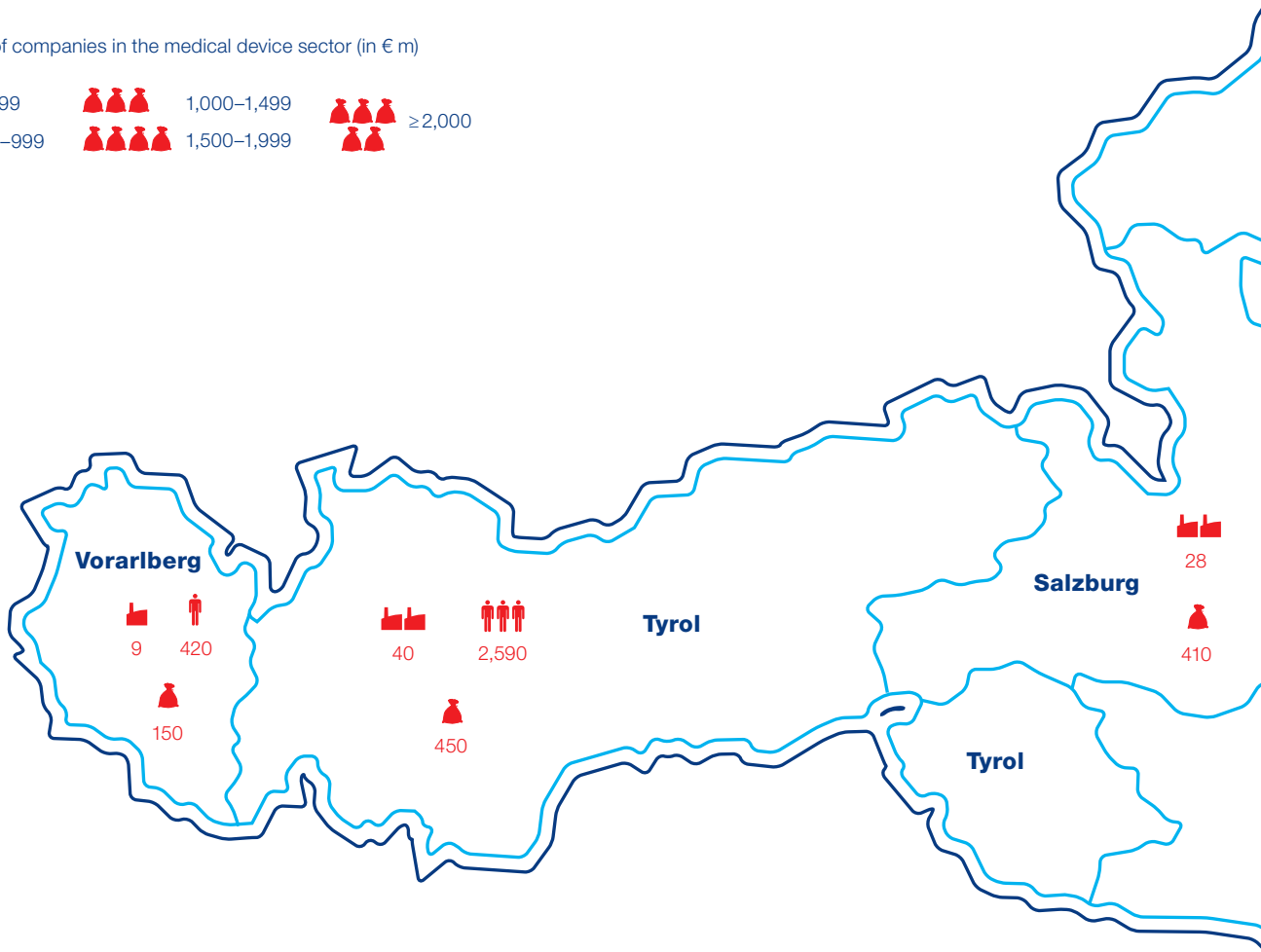
1–24
25–49
50–74
75–100
≥100

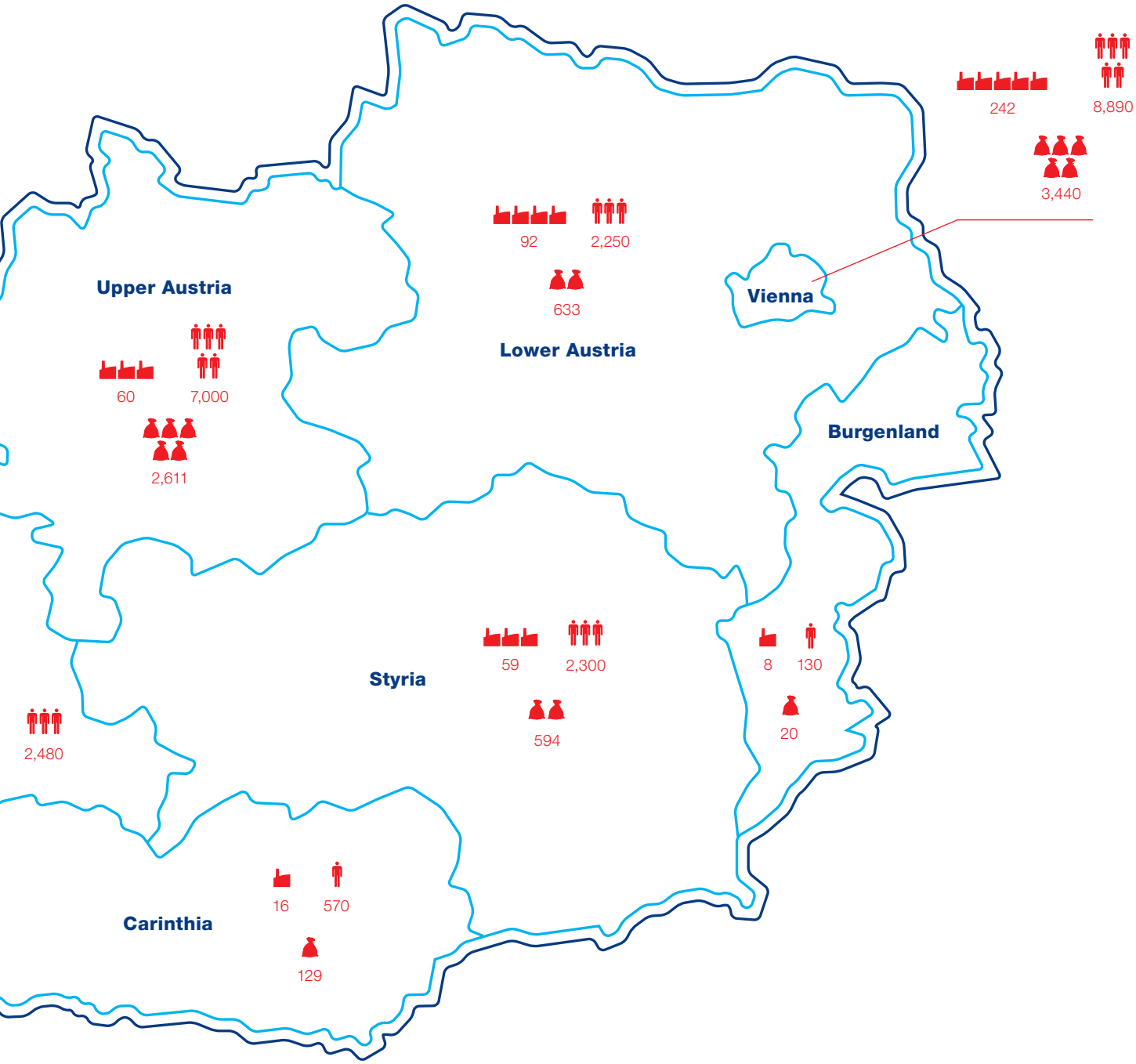
Number of employees in the medical device sector

1–999
1,000–1,999
2,000–2,999
3,000–3,999
≥4,000

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

1–499
500–999
1,000–1,499
1,500–1,999
≥2,000




242
8,890
3,440
92
2,250
633
Vienna
Upper Austria
Lower Austria
60
7,000
2,611
Burgenland
59
2,300
Styria
8
130
20
594
2,480
16
570
Carinthia
129

3.1 Dedicated Medical Device Companies
Structure and Employees

Telemedicine, implants, 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 164 dedicated medical device companies. This is almost a third more than in 2014. Compared to 2010, there was an increase of two thirds. This upturn is mainly due to a remarkably high number of start-ups: 35 newcomers set up shop within the last three years. Twenty new companies were founded in 2016 alone.

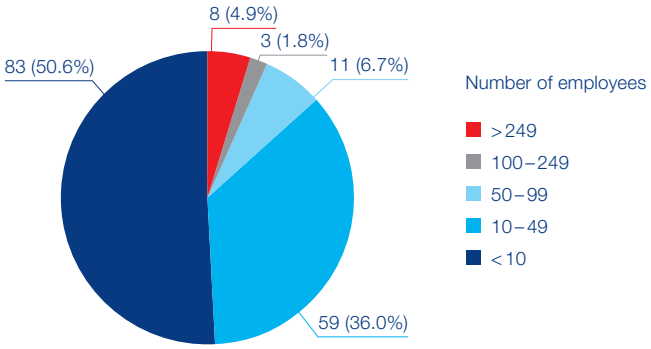


Figure 10: Size structure of dedicated medical device companies in 2017

Young start-ups join long-established companies

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 (49%) are younger than ten years. Another third (32%) 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 2017, all dedicated medical device companies employed 7,790 people. This is a jump of 30% compared to 2014. Compared to seven years ago, the workforce has nearly doubled (2010: 4,213 employees).

The typical medical device company is small

Applying 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. Most companies have a workforce of no more than nine people (50.6%, 83 firms). A total of 59 firms (36%) have ten to 49 employees. Eleven companies employ more than 50 workers (6.7%), and three have a staff of up to 249 (1.8%). At the top of the range, no change can be observed since 2010: a stable core group of eight Austrian medical device companies employs more than 250 people.

	2010	2012	2014	2017
Number of dedicated medical device companies	98	124	124	164
Number of employees in dedicated medical device companies	4,213	5,876	5,980	7,790
Turnover of dedicated medical device companies	EUR 729 m	EUR 1.27bn	EUR 1.31bn	EUR 1.77 bn
R&D expenditure of dedicated medical device companies	EUR 93 m	EUR 104.2 m	EUR 128.7m	EUR 156.6 m
Financing of dedicated medical device companies	EUR 37 m	EUR 26.8 m	EUR 8.5m	EUR 23.8 m

Table 13: Key figures of dedicated medical device companies in Austria 2010, 2012, 2014, 2017

3.1 Dedicated Medical Device Companies
Fields of Activity

The fields of activity in the sector are highly diverse: 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 health care. As part of the survey, the 164 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 11). Most companies consider themselves active in not one but various categories.

Boom in digital health solutions

In 2017, software for medicine, telemedicine and e-health played by far the most important role in the business acitivities of the dedicated medical device companies. More than a third (59 companies, 36%) identified themselves in the survey as having skills and products in this category. This figure is on the rise: Three years earlier, it had been 29% of all mentions (36 companies). Not suprisingly, half of the 35 newcomers in the field belong to this category (17 companies). The 59 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 half as many companies (30 mentions: 18.3%) consider themselves to be active in the area of electromechanical medical devices. Notable among them are firms focusing on ECG or EEG measurements devices. Five companies more than in 2014, namely 27 companies (16.5%) 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, cannulas and small plastic tubes. As with single-use equipment, the reusable devices category has also been a traditional key area in Austria. Sixteen companies (9.8%, up from nine three years earlier) assigned their products to this category. Among them were companies that produce instruments for ventilation technology and cannulas for tissue biopsies.

Austria also has 15 companies (9.1%) that make assistive products for persons with disabilities, and the same number of firms that produce in vitro diagnostic (IVD) devices. The Austrian medical device sector is also well-positioned in the field of non-active implantable devices as wells as hospital hardware. Twelve companies each (7.3%) fall into these categories. Eleven companies (6.7%) assigned their products to the category of dental devices. Each of the remaining classifications, among them active implantable devices and biological-derived devices, only applied to ten companies or fewer.

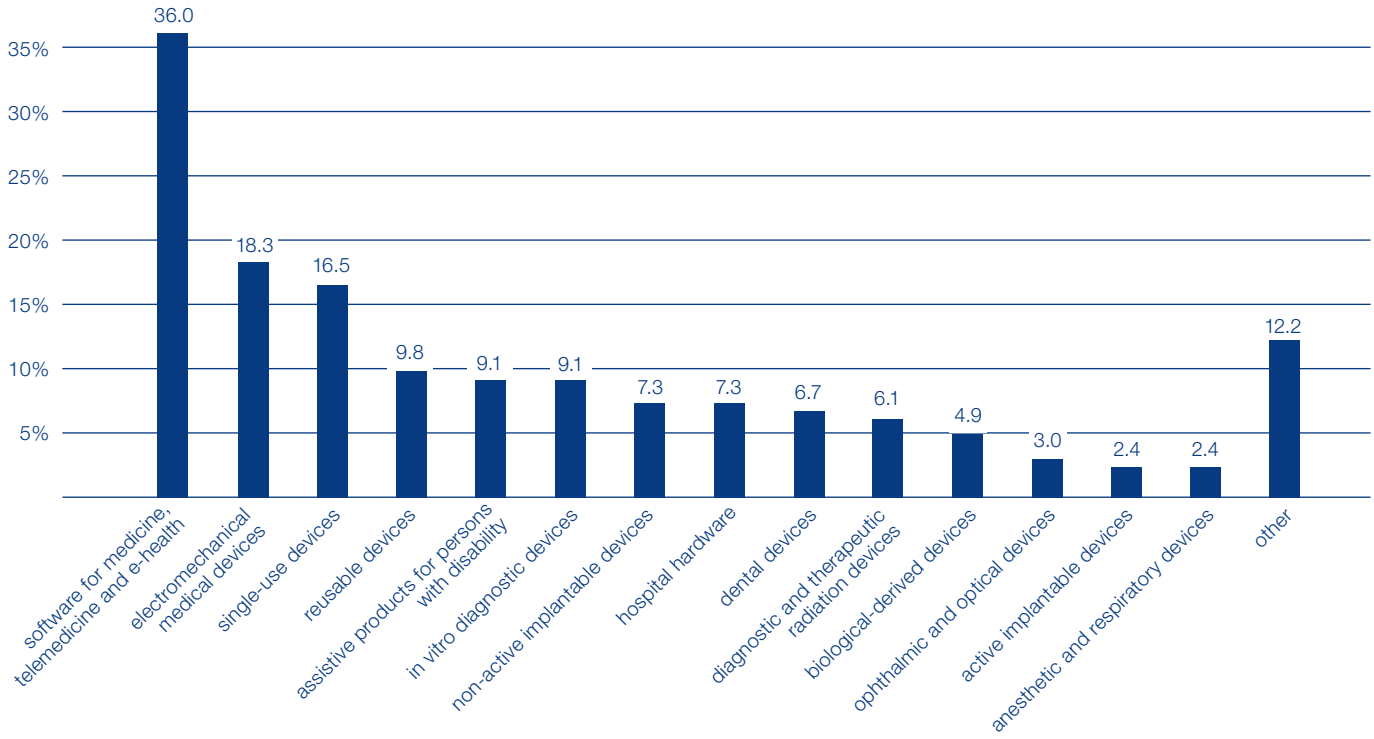


Figure 11: Main areas of activity in dedicated medical device companies in 2017 (multiple answers possible, figures in percent)

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 considerable jump in turnover

In 2017, the Austrian medical devices sector has seen a considerable jump in turnover, mirroring the development of the number of companies. In 2017, dedicated medical device companies generated a turnover of 1.77 billion euros – an increase of 35% when compared to 2014 (1.31 billion euros). Compared to 2010, turnover has more than doubled (2010: 0.73 billion euros). The turnover figures per company confirm the unmistakably positive trend: In 2017, a medical device company recorded a mean turnover of 10.8 million euros. In 2010, the mean turnover per company was about 7.4 million euros, while in 2012, this value had increased to 10.2 million euros. In 2014, the companies' average was 10.6 million euros. Compared to the figure of seven years ago, this signifies an upswing of 46%.

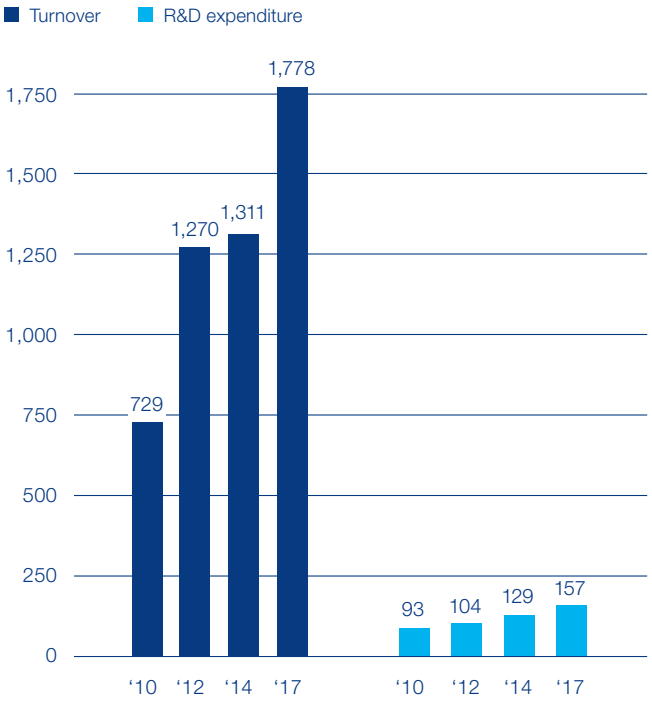


Figure 12: Turnover and R&D expenditure (in € m) of dedicated medical device companies 2010, 2012, 2014, 2017

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.

R&D spending again at record levels

A similar increase can be observed with regard to research and development spending volumes. In 2017, total R&D expenditure of dedicated medical device companies jumped to 157 million euros. Compared to 129 million euros in 2014, this figure is a significant increase of 21.7% and demonstrates the continuously positive economic environment. The percentage of turnover that was reinvested in R&D stayed approximately the same: In 2017, 8.9% of turnover was channeled into R&D. In 2014, that percentage had been 10%. On average, each company spent almost a million euros (0.96 million euros) on research and development. In 2012, this figure had broken through the one-million-euro mark for the first time.

Financing: Back on solid ground

With regard to external capital the numbers have changed quite distinctly over the course of the last few years. With total financings of 36.5 million euros in 2010, and 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. Companies managed to raise 23.8 million euros, coming close to 2012 numbers.

3.2 Other Medical Device Companies
Structure, Employees, Fields of Activity and Turnover

Not all companies active in the medical device field focus on medical technology exclusively. Instead, this business is just one activity among others. These companies are referred to as 'other medical device companies'.

A total of seven Austrian companies have non-core business units operative in the medical device sector (2014: 8 companies). One company that previously belonged to this category was acquired. It can now be found in the 'dedicated medical device company' section, as it is now committed to this business. Another company closed down. However, there was also a newcomer in this segment, founded in 2015.

Dwindling numbers

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.

In 2017, the seven other medical device companies had a total of 970 employees on their payroll. Compared with 2012, this is a decrease of about 20% (2014: 1.220 employees). Accordingly, the number of people working in the medical device divisions of these firms has also decreased. In 2017, the number of staff was 750, while in 2014, there had been 800 people working in the segment. This means that almost eight out of ten employees in the other medical device companies have ties within the medical device industry (77.3%). Just three years ago, this percentage had been below 70%. This demonstrates a growing 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.

Economic impact of the medical device business

In spite of the small total number of companies, they have a considerable economic impact. In 2017, the seven firms achieved a total turnover of 918 million euros, dipping below the one billion euro mark (2014: 1.01 million euros). In the last three years, the numbers decreased by 8.1%. One company, in particular, suffered a drastic drop-off in turnover, especially with a view to turnover in the medical device-related areas. In 2017, only 356 million euros were generated in the medical device field – a quarter below the number of 2014 (475 million euros).

The medical device-related areas of other medical device companies now made up less than 40% of their overall turnover. In 2014, that percentage had still been 47%.

	2010	2012	2014	2017
Number of other medical device companies	14	12	8	7
Number of employees in other medical device companies	1,633	1,280	1,220	970
Number of employees in medical device-related areas of other medical device companies	500	740	800	750
Total turnover of other medical device companies	EUR 864 m	EUR 990.7 m	EUR 1.01 bn	EUR 918 m
Turnover in medical device-related areas of other medical device companies	EUR 373 m	EUR 422.1 m	EUR 475 m	EUR 356 m

Table 14: Key figures of other medical device companies 2010, 2012, 2014, 2017

3.3 Suppliers in the Medical Device Sector
Structure, Employees, Fields of Activity and Turnover

Medical device companies rely on a vast array of high-tech suppliers to design and manufacture sophisticated products: be it medical gases, automation, electrical machine building or injection molded devices. According to the survey, suppliers in the medical device sector generated a turnover of 2.88 billion euros in 2017 – a jump of 15.7% compared to 2014, when the companies accounted for a turnover of 2.49 billion euros. On average, medical device suppliers have a turnover of 49.7 million euros per company.

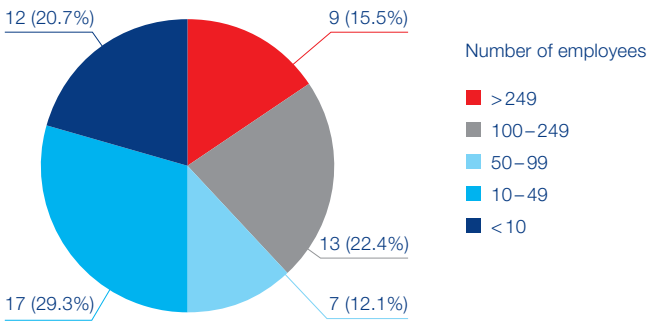


Figure 13: Size structure of suppliers in the medical device sector in 2017

Mixed bag: Supplier companies come in all sizes

Altogether, 58 supply companies provide the Austrian medical device industry with chemicals, commodities and manufacturing equipment. These include both medium-sized and small firms. Altogether, the service providers accounted for 9,200 employees in 2017. Compared to 2014 (10,090 staff), this is a slight decrease of 8.2%. Exactly half of all the supply companies are run by either less than ten people (20.7%) or less than 50 (29.3%). Seven companies have between 50 and 99 people on the payroll (12.1%). A total of thirteen suppliers work with more than 100 but less than 250 employees (22.4%). Nine firms have a workforce of more than 249 people.

Electronical and mechanical expertise build a stable fundament of medtech business

More than one third of all suppliers and contractors file a major part of their activities under mechatronics and mechanical engineering (34.5%). Thirty-one percent each are producers of electronical equipment or carry out plastics machining and processing. Specialists for measurement and sensor technology (24.1%) also reflect a significant part of the medtech supplier sector, as do providers of metal machining and processing (17.2%).

Beyond that, medical device enterprises also take advantage of the expertise provided by laser technology, ceramic preparation and processing, laboratory equipment and micro- and nanotechnology (5.2% each). Lastly, the areas of glass preparation and processing as well as consumables and reagents are each represented by 1.7%. Companies that do not fall into any of these categories add up to 15.5 %. Within the scope of this study, several companies confirmed their activities in multiple areas of medical devices.

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

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

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.

Company numbers grow by almost a half

In 2017, the survey listed 32 companies that offer different services to the medical device industry. This represents a significant increase of 45% compared to 2014, when 22 service provider were recorded (2012: 15 companies). 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.

Big players coexist with many smaller companies

In total, small companies with fewer than ten employees make up a good 40% of all companies – up from 21.4% in 2014. Almost as many service providers have between ten to 49 employees on their payroll (37.5%). Not even 10% of all companies work with 50 to 99 employees (3 companies, 9.4%). Two companies are either middle-sized, with a workforce between 100 and 249 people, or large enterprises, with more than 249 employees (6.3% each).

Altogether, the service providers in the medical device sector accounted for 2,780 employees in 2017. Compared to 2014, when 2,280 employees were on the books, this is a considerable increase of 22%.

In 2017, service providers in the sector did business worth 355 million euros. Compared to 2014 (315.5 million euros), this represents a plus of 12.5%. Given that there are still comparatively few companies in the sector, the figure underlines the economic importance for the medical device sector and Austria's industry as a whole.

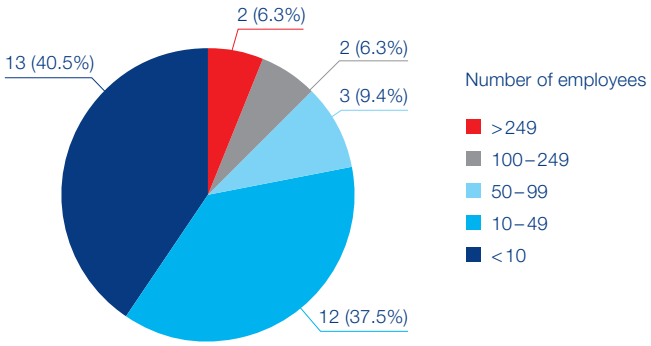


Figure 14: Size structure of service providers in the medical device sector in 2017

IT services make up a third of service providers

The areas of expertise are extremely varied, which is a handicap for a coherent analysis between these companies. However, information technology remains one of the key fields for service providers. A third of the companies offer electronic data processing, software analysis or other IT services.

The segment of washing and processing hospital textiles and clothing constitutes another major field of activity as it 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 of activity include contract research, quality management and regulatory consulting as well as preparation units for medical devices. A quarter of all companies responded they work in "other" fields, which further illustrated the wide variety of activities in this segment.

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

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

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 for sales and distribution firms

In 2017, there were 293 sales and distribution companies operative in Austria's medical device industry. Compared to 2014, this is a slight increase of 5.8%. The number of employees has likewise risen only marginally. There are now 5,890 people on the payroll of sales and distribution companies in the medtech field – an increase of 5.4% compared to 2014 (5,590 employees).

In terms of turnover, the 293 sales and distribution firms constitute a relevant economic factor in the medical device industry. In 2017, they generated 2.52 billion euros in turnover – up from 2.33 billion euros in 2014 (an increase of 8.2%).

Many companies with few employees

With respect to the company structure, the sales and distribution firms are rather small. About 90% of all companies have less than 50 employees. The average company engages 20 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
Number of sales and distribution companies in the medical device sector	234	277	293
Number of employees of sales and distribution companies in the medical device sector	5,626	5,590	5,890
Turnover of sales and distribution companies in the medical device sector	EUR 2.33bn	EUR 2.33bn	EUR 2.52 bn

Table 17: Key figures of sales and distribution companies in the medical device sector

4.0 Academic Life Science Research and Education in Austria

Overview

Austria's life science sector capitalizes on the fully fledged academic life science landscape in the country. A total of 55 institutions, varying in size, have diverse 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.

Research builds the foundation for the sector

Altogether, 17 universities, 13 universities of applied sciences and 25 non-university research institutes are 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 52 institutions gave specifications on their life science related staff. According to this, more than 21,000 employees – of which 58% have a scientific background – were working in the Austrian academic life science sector in 2017. At 55.3%, the proportion of female staff remains at a high level.

Life science budget of 1.55 billion euros

With respect to the overall life science budget in the academic field, the report analyzed data made available by 42 institutions. In 2017, this group alone had a specific life science budget of 1.55 billion euros dedicated to teaching, research, administration and infrastructure. About 73.5% of the budget (1.14 billion euros) stems from institutional funding, whereas 26.5% (412.2 million euros) represents third-party funds. The major funder in terms of institutional as well as third party funding is the Austrian government, which supplied around 1.35 billion euros for the academic life science sector in 2017. Both the institutional budgets of the Austrian public universities and those of the large non-university research institutions are government-financed. In addition, 205 million euros in third-party funds were made available for the life sciences in 2017 from government funds such as the Austrian Science Fund FWF, the Austrian Research Promotion Agency FFG, the Ludwig Boltzmann Society, the Christian Doppler Society and others. Industrial partners supported life science research with 144 million euros. Further money was raised from regional or European sources. The high proportion of third party funding demonstrates the high academic excellence of the Austrian life sciences. This is also shown when it comes to attracting European funding sources such as the prestigious grants from the European Research Council (ERC). Since the founding of the ERC in 2007, a total of 116 Austrian life science researchers have raised an ERC grant.

Output data

The scientific output of Austrian life science research can be measured by the total number of publications in this field. According to the 47 institutions that made this information available, more than 9,300 papers (only with first and/or last authorship of the Austrian institution) were published in peer-reviewed journals in 2017. Besides high-quality research, a primary task of the academic institutions is to provide the sector with well-trained people. In 2017, the total number of life science students at universities and universities of applied sciences amounted to more than 67,000, of which more than half were women. Moreover, nearly 7,750 students graduated in 2017 in one of the life science related disciplines.

	2014	2017
Number of research and education institutions active in life sciences	55	55
Number of life science employees (n=52 | n=52)	19,830	21,145
Number of life science employees in R&D (n=49 | n=37)	11,229	12,271
Number of life science students (n=28 | n=28)	59,166	67,218
Number of graduations in life sciences (bachelor, master, PhD) (n=25 | n=22)	7,947	7,752
Total life science budget of research and education institutions (n=43 | n=42)	EUR 1.44 bn	EUR 1.55bn
Third party funding for research and teaching institutions in life sciences (n=41 | n=40)	EUR 385.6m	EUR 412.2m
Number of peer-reviewed academic publications in life sciences (n=43 | n=47)	8,779	9,363

Table 18: Key figures of research and education institutions active in life sciences 2014, 2017 (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

1
2–3
4–5
6–7
≥8

Number of life science employees

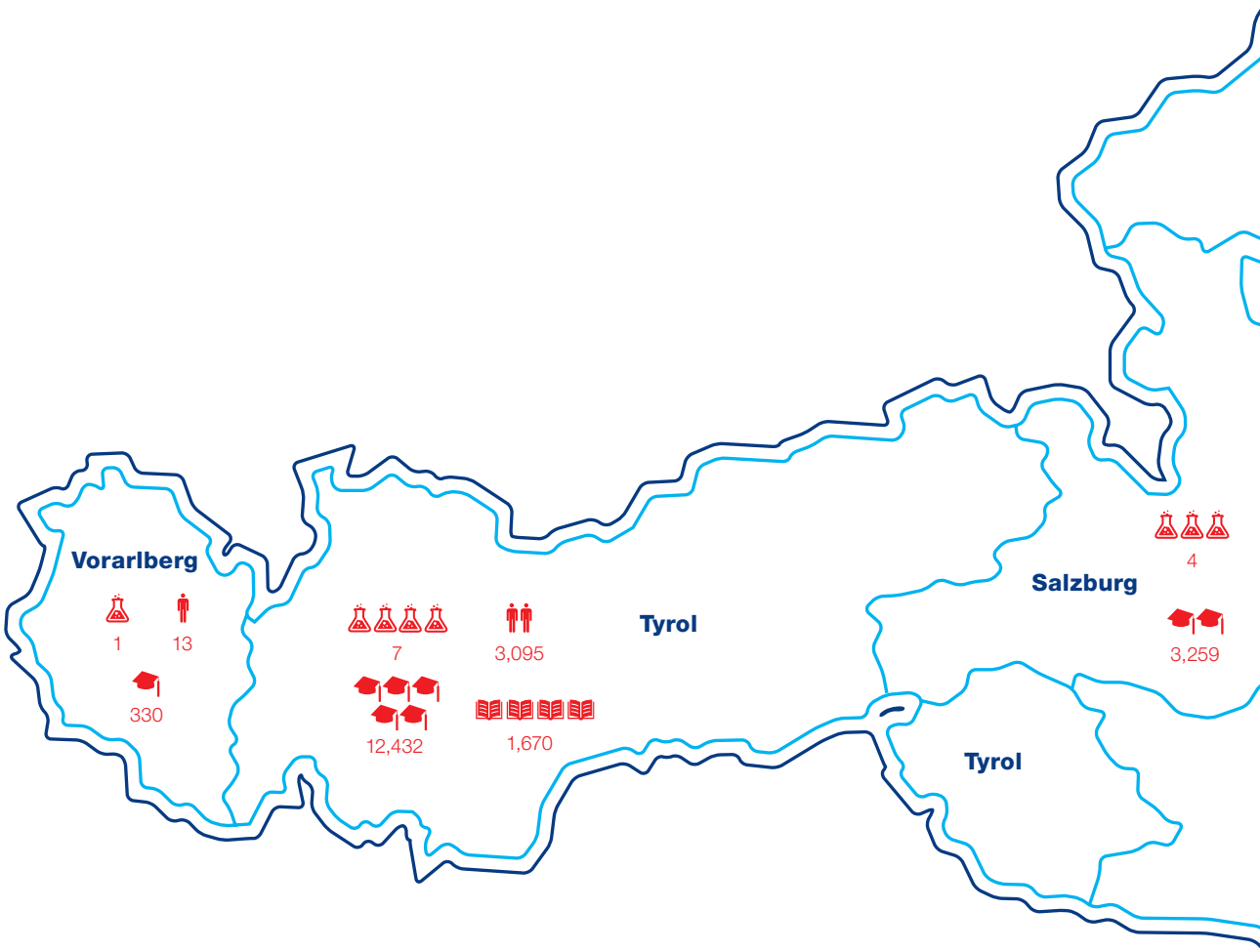
1–2,499
2,500–4,999
5,000–7,499
7,500–9,999
≥10,000

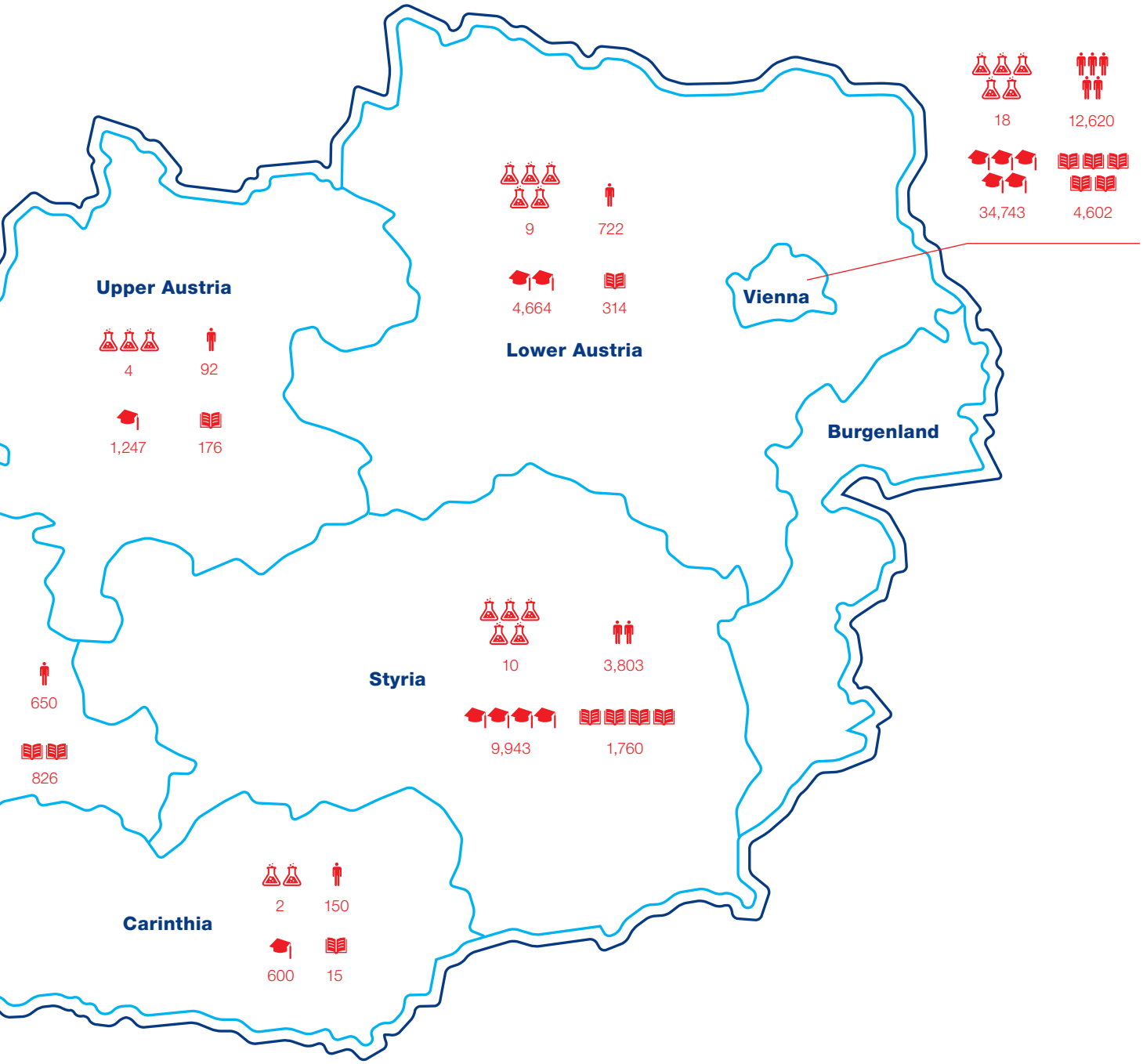
Number of life science students

1–2,499
2,500–4,999
5,000–7,499
7,500–9,999
≥10,000

Number of peer-reviewed academic publications in life sciences

1–499
500–999
1,000–1,499
1,500–1,999
≥2,000




Upper Austria
4
92
1,247
176
Lower Austria
9
722
4,664
314
Vienna
18
12,620
34,743
4,602
Burgenland
Styria
10
3,803
9,943
1,760
650
826
Carinthia
2
150
600
15

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 18,000 employees

Austrian universities are an attractive workplace for highly skilled people. In 2017, they recorded a total of 18,068 life science related employees. Fifty-one percent of university staff are women. The proportion of researchers is high: Fifty-seven percent of the university employees work in scientific areas. Their output was measured with regard to the number of peer-review publications. Seventeen universities answered the respective part of the survey. In 2017, they released almost 8,500 papers with relevance to the life sciences. Scientists at Austrian universities are also very successful in acquiring the renowned grants of the European Research Council (ERC). Of all ERC grants awarded in the life sciences since 2007, 42% went to universities.

Although only eleven institutions specified their financial situation in the survey, their institutional budget for life sciences totaled 1.3 billion euros – more than in 2014, when two more universities made their information available. This amount includes teaching, research, administration and infrastructure costs. The 14 universities which reported the volume of their third-party funds had 302 million euros of external money available in 2017. A major part of 149 million euros can be attributed to sources from the Austrian government and a total of 86 million euros stem from industrial partners.

Among students, there is a growing interest in the diverse life science fields. 60,222 students were reported in 2017. This is an increase of 10% compared to 2014, which counts for even more when considering that one more university supplied this information three years ago. This is also true for the life science sector. As reported by twelve universities, the number of students graduating in 2017 amounted to 5,706.

	2014	2017
Number of universities active in life sciences	17	17
Number of life science employees (n=16 | n=15)	16,879	18,068
Number of life science employees in R&D (n=15 | n=10)	9,075	10,246
Number of life science students (n=16 | n=15)	54,196	60,222
Number of graduations in life sciences (bachelor, master, PhD) (n=14 | n=12)	6,563	5,706
Total life science budget of universities (n=13 | n=12)	EUR 1.18bn	EUR 1.3bn
Third party funding for universities in life sciences (n=15 | n=14)	EUR 270.3m	EUR 301.9m
Number of peer-reviewed academic publications in life sciences (n=15 | n=17)	7,826	8,481

Table 19: Key figures of universities active in life sciences 2014, 2017 (n=number of responses)

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.

Broad scope of teaching

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.

All of the 13 institutions specified their number of workforce. Together they accounted for 621 employees in 2017. At 67.7%, the proportion of women is at a particularly high level. A total of 268 employees teach and/or work as researchers in the life sciences – 43% of all the employees. Nine universities of applied sciences answered the questions regarding their scientific publishing activities. They recorded 57 life science papers in peer-reviewed journals in 2017.

All 13 institutions published data on their educational capacities within this survey. They reported a total of 6,996 students in the life sciences – quite a significant jump of 41% to 2014 (4,970 students). However, back then, only twelve universities answered this question. With regard to the number of graduates, eleven universities of applied sciences in Austria gave feedback to the respective question in the survey, accounting for 2,046 bachelor's (1,440), master's (601) and doctor's degrees (5) in 2017.

Life science budget

A total of eleven institutions disclosed their financial situation within the report. According to this, they reported a combined life science budget of 26.6 million euros in 2017. 7.3 million euros stem from third party funds.

	2014	2017
Number of universities of applied sciences active in life sciences	13	13
Number of life science employees (n=12 | n=13)	398	621
Number of life science employees in R&D (n=12 | n=10)	166	268
Number of life science students (n=12 | n=13)	4,970	6,996
Number of graduations in life sciences (bachelor, master, PhD) (n=11 | n=10)	1,384	2,046
Total life science budget of universities of applied sciences (n=9 | n= 11)	EUR 26.2m	EUR 26.6m
Third party funding of universities of applied sciences in life sciences (n=9 | n=11)	EUR 12.7m	EUR 7.34m
Number of peer-reviewed academic publications in life sciences (n=8 | n=9)	75	57

Table 20: Key figures of universities of applied sciences active in life sciences 2014, 2017 (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.

A half 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.

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 2017, the non-university research institutes in Austria had a combined life science staff of 2,456 people. Almost two thirds are working as researchers (72%). About half (50.7%) are women. Twenty-one institutes specified their publication output. According to this, they released 825 papers in peer-reviewed journals in 2017 – a marked reduction from 2014, especially when considering that fewer institutions had provided this information three years ago.

Non-university research institutes are very successful in obtaining the prestigious grants from the European Research Council (ERC). Fifty-eight percent of the ERC grants in life sciences that have been received by Austrian institutions since 2007 were raised in this category. Within the framework of the survey, 19 institutions disclosed their budget information. Together, they accounted for a budget of 225 million euros. Fifteen institutes reported on their third-party funds for life sciences, which added up to 103 million euros of external money.

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

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

5. Outlook Life Sciences in Austria

During the past decades, the life sciences established as one of the fastest growing driving engines for economies worldwide. Innovative breakthrough technologies from the biotechnological, pharmaceutical and medical device sector offer a huge potential for tackling major challenges of the health systems in the 21st century: the need for efficient therapies and diagnostics is higher than ever, demographic change forces companies and governments to implement more effective infrastructures to deal with the requirements of aging society. At the same time countries all over the world move steadily towards a knowledge-based economy, combining the progress made in natural sciences with the experiences in IT-related areas and digitization to meet the global sustainable developments 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.

Today, the country offers an attractive environment for high-class research within a strong network of internationally renowned scientific centers, enabling cutting-edge technology development and growing 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 importance of the healthcare sector for the whole country is also demonstrated by key economic figures: Almost 16% of the Austrian GDP is directly or indirectly generated by the healthcare sector, a total of 14% of the employees in Austria are working here, underlining the essential role of health care as an economic driving force. With a total turnover of 22.4 billion euros a year, the life sciences provide a key pillar for this success and this report highlights its strengths and potential in all areas of life sciences.

New national life science strategy to foster the Austrian innovation power

Without the government's strong commitment to support the life sciences and to foster research and development (R&D) capabilities all over the country, this success would not have been possible. In 2016, as a result of a national strategic process involving all relevant life science stakeholders, the federal government published a new life science strategy ("Zukunftsstrategie Life Sciences und Pharmastandort Österreich"). It aims at further developing and strengthening the domestic science, research and business landscape along the whole innovation value chain from early research to market uptake.

Over the past years, Austria has set the course for building on its achievements, enlarging its capabilities for clinical trials, among others, and occupying new fields such as personalized medicine and stem cell research. A special focus is put on activities to improve translation, to foster science-business partnerships, to enable international cooperation, to facilitate the founding of new life science ventures and to help establish platforms in which stakeholders can interact and public and private investors can match their experiences most efficiently.

Strong focus on translation and digitalization

One of the key national projects in the upcoming years will be to set up a new Translational Research Center (TRC), providing perfect conditions to bring basic life science research results into application and towards the patients. The TRC aims at further strengthening the innovative power of the Austrian life science community and is supported by the whole community. Another important strategic focus will be to leverage the potential of digitalization for science, industry and society. Due to its high potential for tackling societal challenges, the government has committed itself to strongly support activities in this area. The federal government is also aware of further improving conditions for research-intensive companies. In 2018, the research premium for R&D companies has been lifted to 14%. In addition, further measures are planned to reduce bureaucratic loads and to lower corporation taxes and fees. On the European level, the Austrian government supports intellectual property rights and incentives for innovative drugs.

Austria is a vibrant life science hub. Austrian life science companies and organizations are constantly working hard to further develop the sector internationally by exhibiting at international trade fairs and conferences. In 2019, Vienna is hosting the BioEurope Spring conference, expecting more than 2,500 delegates of the biotech and pharma sector.

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, BIOCOM 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”.

For the first time this year, 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 in terms of content with the range of products covering everything from latex gloves to CAT scanners. 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 directive 93/42/EEC. The directive 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 February and May 2018, a total of 917 companies were contacted and requested to complete the survey. Four hundred and thirty-two of the companies answered either by questionnaire or by telephone, corresponding to a response rate of 47.1% (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. Fifty answered by questionnaire or by telephone, corresponding to a response rate of 90.9%. 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 31.12.2017.

	requested/answered	response quote
Life science companies	917/432	47.1%
Biotechnology and pharma companies	363/226	62.3%
Research, development or manufacturing biotechnology and pharma companies	207/146	70.5%
Dedicated biotechnology companies	127/96	75.6%
Other biotechnology active companies	45/31	68.8%
Pharma companies	35/19	54.3%
Suppliers, service providers, sales and distribution companies	156/80	51.3%
Suppliers	26/13	50%
Service providers	38/21	55.3%
Sales and distribution companies	92/46	50%
Medical device companies	554/206	37.2%
Research, development or manufacturing medical device companies	171/74	43.3%
Dedicated medical device companies	164/69	42.1%
Other medical device companies	7/5	71.4%
Suppliers, service providers, sales and distribution companies	383/132	34.5%
Suppliers	58/27	46.6%
Service providers	32/15	46.9%
Sales and distribution companies	293/90	30.7%
Research and education institutions active in life sciences	55/50	90.9%
Universities	17/13	76.5%
Universities of applied sciences	13/13	100%
Non-university research institutes	25/24	96%

Table 22: Overview of response quotes of different types of life science companies and life science research and education institutions 2017

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 of 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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