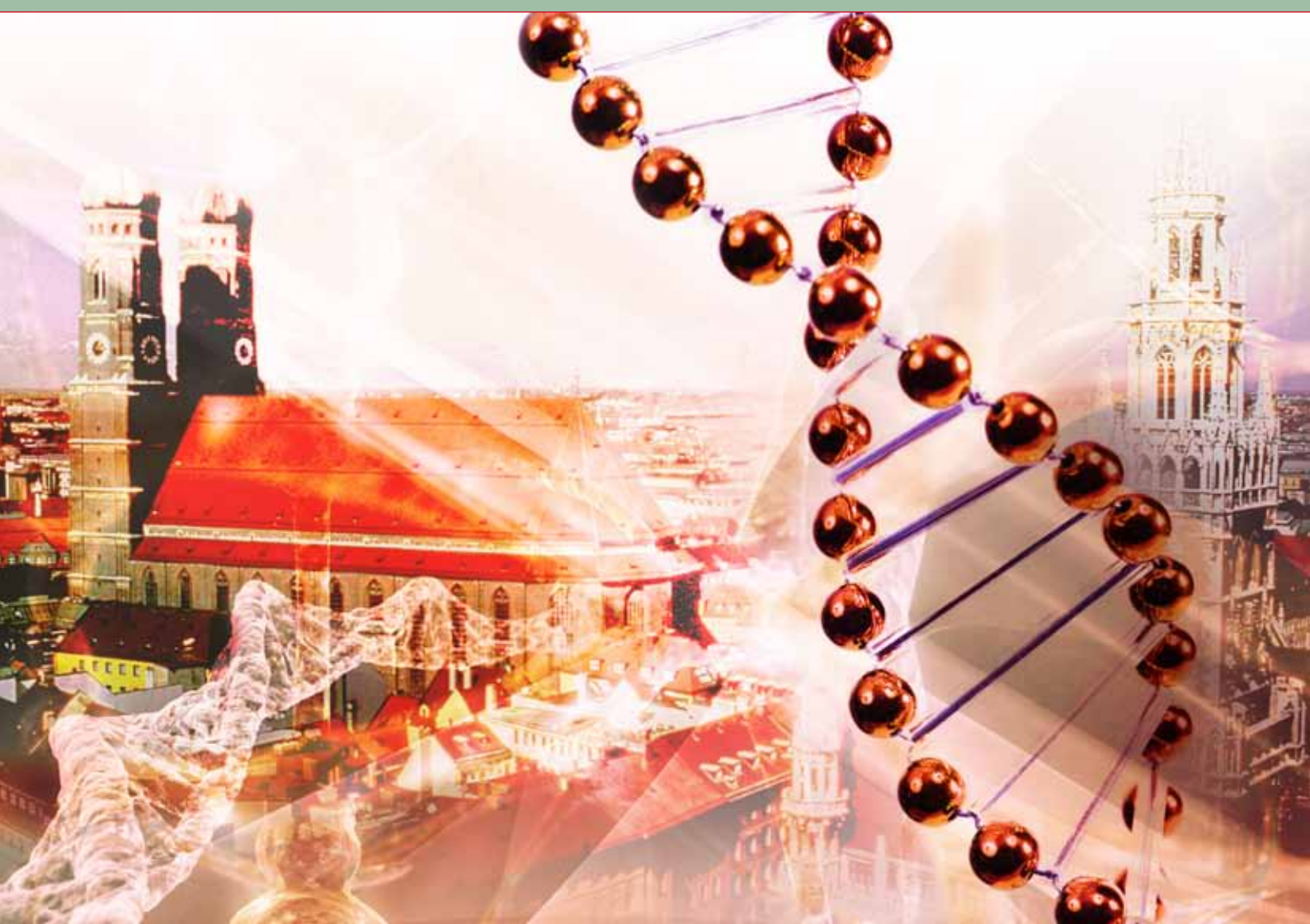


# Biotechnology and Pharmaceuticals 2008

in the European Metropolitan Region Munich (EMM)



Industrie- und Handelskammer für  
München und Oberbayern



Landeshauptstadt  
München  
**Referat für Arbeit  
und Wirtschaft**







*Peter Driessen  
Managing Director, Chamber of Industry and Commerce  
for Munich and Upper Bavaria*



*Dieter Reiter  
Head of Department of Labor and Economic Development,  
City of Munich*



*Prof. Dr. Horst Domdey  
Managing Director,  
Bio<sup>M</sup> Biotech Cluster Development GmbH*

The European Metropolitan Region Munich (EMM) has nearly 400 companies and eight renowned research institutions, making it one of the leading locations in Europe for the biotechnology and pharmaceutical industries. Producing a turnover of 10.5 billion euros in 2008 and employing over 30,000 people in industry and research – two thirds of them in industry – this sector is making a major contribution to the economic power of the EMM. Munich has seen the rise of a well developed cluster in and around the city which now extends far beyond the EMM.

These are the findings of the study „Biotechnology and Pharmaceuticals in the European Metropolitan Region Munich in 2008“, jointly carried out by the Chamber of Industry and Commerce for Munich and Upper Bavaria, The City of Munich Department of Labor and Economic Development as well as Bio<sup>M</sup> GmbH. The study presents the agents, activities and potentials in the life science industry, analyses development trends and business potential and measures the degree of satisfaction with the conditions connected to being located in the EMM. The development over the past three years is shown through the comparison with the study of the Munich region dating from 2005, which took a slightly smaller geographic radius into account.

A wide variety of companies and research institutions work in the EMM. 127 small and mid-size biotech companies are joined by 78 international companies working in biotechnology and pharmaceuticals. In addition, there are 53 contract research organisations (CROs) and 127 other life science companies, as well as suppliers and wholesalers. Munich itself is most popular with biotech companies and CROs, while pharmaceutical companies, wholesalers and other companies, located throughout the region, spread a great deal of economic power across the entire EMM.

In the past three years the number of companies and staff and the volume of turnover have grown. In the EEM, 10.5 billion euros in turnover were generated in the life sciences, with 3.7 billion generated in pharmaceuticals, 2.8 billion in biotech and ca. 4 billion euros by CROs and other companies. The employees are mainly highly qualified specialists in research, development, production and marketing. Compared to engineering, the biotech and pharmaceutical industries employ an above average number of female college graduates.

The educational landscape in the EMM can really score, boasting two elite universities, three world renowned Max Planck Institutes, the Helmholtz Zentrum München – German Research Center for Environment and Health, as well as universities of applied science for practical technical training.

The survey was carried out from late 2008 to early 2009 – at a time of general economic decline. Nevertheless, the majority of the companies reported a positive business outlook for the mid-term: 50 per cent of the surveyed companies said they expect the situation to improve as early as next year, and 73 per cent expect improvement within the next five years. The positive assessment of location factors points in the same direction: Both the companies and the research institutions give high marks to the excellent local research environment, the high quality of living and the „cluster effect“. The degree of networking between companies as well as between businesses and research institutions is continuing to intensify. While networks between companies are becoming ever more international, the collaboration trend between business and research favours institutions working in the region. The great power of innovation registered in the EMM will continue to strengthen the attractiveness of this location and its perception internationally. The companies and research institutions located here see their future right here, in the EMM.



## Biotechnology and pharmaceuticals 2008 in the EMM

3	<b>Preface</b>
6	<b>Biotechnology and pharmaceuticals in the EMM – Taking stock</b>
6	Reason for this study
7	The rise of the biotechnology and pharmaceutical cluster in the EMM
9	Excellence in research
11	Technology transfer and networks
12	Facts and figures at a glance
17	<b>The sector in detail – Biotech companies</b>
17	Corporate structures in biotechnology
18	Distribution and qualifications of staff
20	Cooperation between business and research
21	Developing new products
22	Financing
23	Revenue and investment in R&D
23	Assessing business trends
24	<b>The sector in detail – Pharmaceutical companies</b>
24	Corporate structures in the pharmaceutical industry
25	Assessing business trends
26	<b>The sector in detail – Contract research organisations (CROs)</b>
26	Corporate structures in CROs
27	Assessing business trends
28	<b>The sector in detail – Other life science companies</b>
28	Corporate variety among the other life science companies
29	Assessing business trends
30	<b>Location satisfaction and loyalty in the EMM</b>
32	<b>Research methodology</b>



## Reason for this study

Since the 1990s, Munich and the surrounding European Metropolitan Region Munich (EMM) has developed into a leading European business center for the biotechnology and pharmaceutical industries. Aiming to assess the location more closely, the Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, the City of Munich Department of Labor and Economic Development and the Bio<sup>M</sup> Biotech Cluster Development GmbH have compiled this new study. Munich was first analysed as a location for biotechnology and pharmaceuticals by the same partners in 2005. The same method and approach used in that study have again been applied in this one to assure comparable results. Nearly 400 companies and the relevant research institutions in the EMM were polled in writing; in addition, qualitative interviews were carried out (see page 32). The results of the two studies were then correlated.

The new study differs from the previous one of 2005 with regard to the scope of the area studied. The study of 2005 covered planning region 14 including Bernried and Penzberg. The current study extends to the entire EMM (see Fig. 1, p. 9). Metropolitan regions are cores of economic activity. These densely populated regions have agglomerated functions that steer and drive innovation and decisions and provide gateways that play a key role in global competition.

The resulting study not only provides an overview of the current quantitative development of the EMM region as a location for biotechnology and pharmaceuticals, it also describes the essential location qualities. As the „knowledge-based economy“ is of particular importance for the life science industry, this study also focuses on the research and science landscape and its wide variety

of networks – including those involving businesses.

## The rise of the biotechnology and pharmaceutical cluster in the EMM

The establishment of the university clinic in Großhadern in the early 70s on the southwestern outskirts of town was the first significant step in the development of the biotechnology location Munich. The mid 70s saw the foundation of the Max Planck Institute for Biochemistry in Martinsried near Munich, followed in the mid 80s by the German Gene Center, headed by Prof. Ernst-Ludwig Winnacker, also located in Martinsried. These two institutions laid the solid cornerstone for research in the region, and enjoy international renown today as they focus on business applications for scientific research. They provided science with an excellent basis for growth, and were key in establishing the region as a biotech location. It only took a few years before the „critical mass“ of application-oriented scientists was available to generate a strong dynamic, leading to the foundation in the late 80s and early 90s of early companies such as Mikrogen, Micromet, MorphoSys and MediGene. The development in Martinsried was boosted still further from 1995 after the foundation of the Innovation Center for Biotechnology (IZB), the center in the region specifically geared to biotechnology. The spirit of optimism got yet another boost when the region participated successfully in the „BioRegio“ competition organised by the German Federal Ministry of Education and Research in 1996, and Munich as well as the Rhineland and the Rhine-Neckar region received awards which acted as additional catalysts. This resulted in a real start-up boom in 1997 and 1998, which diminished slightly thereafter, but generated over 150 new biotech companies.

The speedy ascent of the industry experienced a first setback when the stock markets went bust at the turn of the millennium. In the following years the external financing that any young industry depends on became far more difficult to procure. So the biotech industry, not even 10 years old, was forced into its first existential crisis.

The market and with it the EMM, however, soon rebounded and the crisis was followed by a period of stabilization and steady and sustained growth. Today the EMM is one of Germany's leading centers for „red biotechnology“, i.e. the development of drugs in the „genomic and post-genomic era“. This is shown by studies carried out by the Kiel Institute for the World Economy (IfW, 2005) and countless publications, such as the annual industry reports or the special report by GoingPublic on „Biotechnology 2008“. Munich is the only German location to join the ranks of leading biotechnology regions in Europe. The list is headed by Cambridge (GB), followed by Basel (CH) and Copenhagen/Lund (DK/S), with Munich following closely (see P. Cooke 2007, A Comparative Analysis of German and UK Biotechnology Clusters). The new study shows that Munich is the only German location able to compete and to play a role in the global pharmaceutical and the innovative biotech industries. In contrast to biotechnology, many of the pharmaceutical companies have been based in the EMM for decades. These generally small to midsize enterprises have been able to establish themselves in a wide variety of niches including the prescription drug market, proprietary development and marketing and sales. Even if Munich was not generally considered a traditional location for pharmaceuticals, that image has changed.

For example, the Swiss Novartis group moved the headquarters of its generic drugs subsidiary Sandoz from Vienna to Holzkirch-

en after the subsidiary took over Hexal there in 2005. Penzberg has proved to be a second successful location in the region for a Swiss pharmaceutical giant, namely for Roche. Since it took over Penzberg ten years ago, Roche has invested over 1.5 billion euros in new plants and doubled its staff, so that it employs 4,400 people today. Penzberg has been able to prevail in the internal competition for investments, beating international Roche locations in the USA and Asia. Penzberg has now been able to establish itself as a true „center of excellence in therapeutic proteins“ within the corporate group.

The EMM therefore does have international „BigPharma“ companies to show, companies built on the basis of solid, local business models now being further developed. But there are also international „BigPharma“ companies that have come to Munich specifically to create centers of research, production or marketing for Central Europe. The British company GlaxoSmithKline carries out a major portion of its clinical trials in Munich. General Electric Healthcare (GEHC) opened its new international R&D center, the GE Global Research Center, in Garching near Munich in 2004. The US pharmaceutical giant Merck & Co. – the third-largest pharmaceutical company on earth –, whose German branch MSD Sharp & Dohme was set up in Haar near Munich in 1994, decided in 2007 to move its EMEAC-hub (Europe, Middle East, Africa, Canada) to Haar, as well.

When two Japanese pharmaceutical companies, one of which had formerly taken over the Luitpold works (Mobilat) in Pfaffenhofen, merged to form Daiichi-Sankyo, the new Japanese conglomerate found itself firmly established in the EMM. In the course of a new orientation on the European market these deep roots allowed Daiichi-Sankyo to set up its central office not just for Germany, but for the whole of Europe in



Munich. 4 billion pills annually are produced today in Pfaffenhofen and sold worldwide. At the same time Daiichi-Sankyo was involved in setting up collaborations with the biotechnology industry in Munich (MorphoSys), which in 2008 led to the acquisition of a Munich company - U3 Pharma in Martinsried. That company's early projects in drugs are now being carried on by Daiichi-Sankyo at the Munich-Martinsried location by an extended team of staff members.

The economic role of the pharmaceutical industry in the EMM is particularly apparent in the way international groups have become increasingly involved. Whether the headquarters are located in the EMM is of minor importance compared to what the corporation is actually doing at this location.

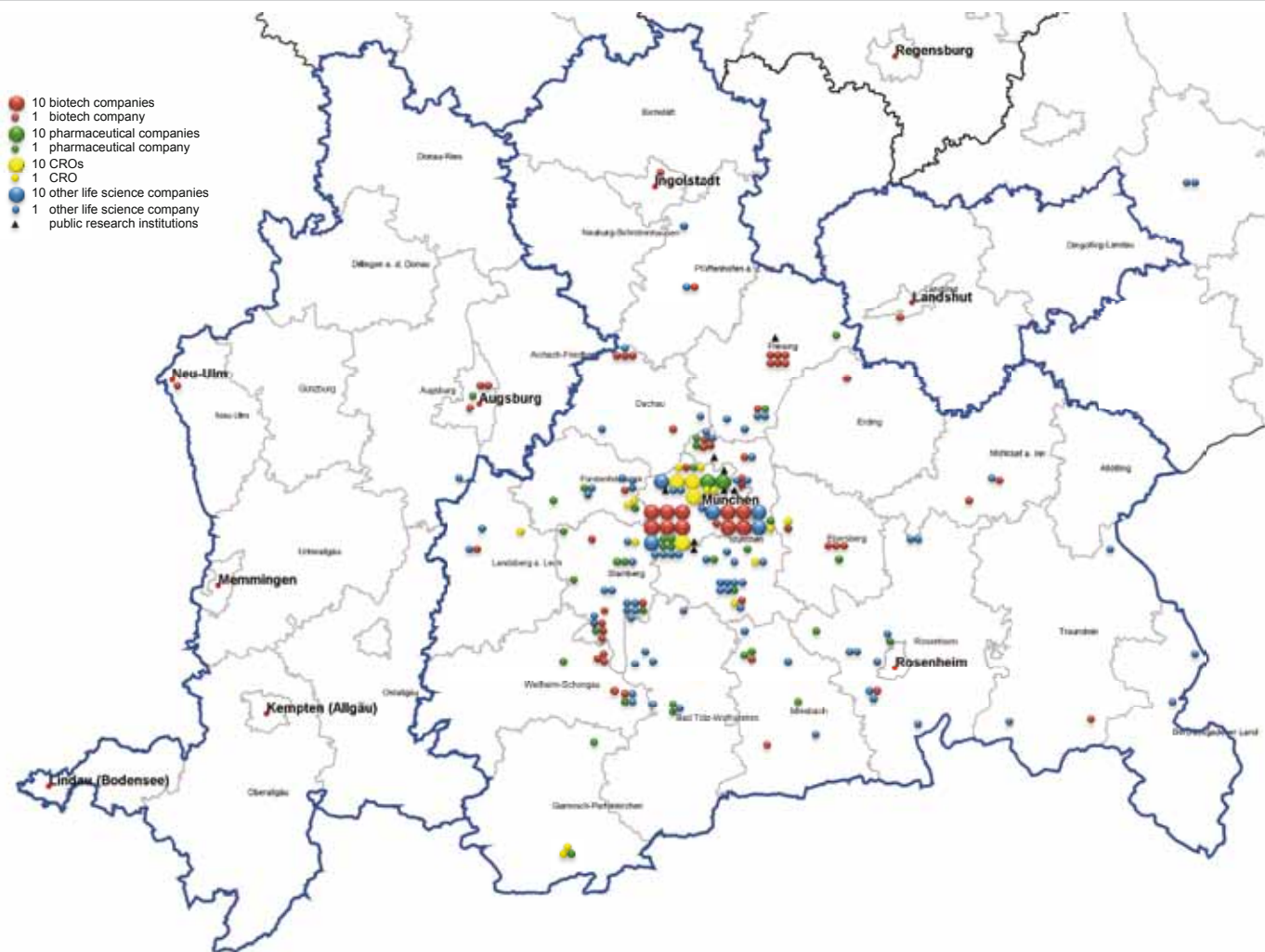


Fig. 1: Geographic distribution of the surveyed companies and research institutions in the EMM

## Excellence in research

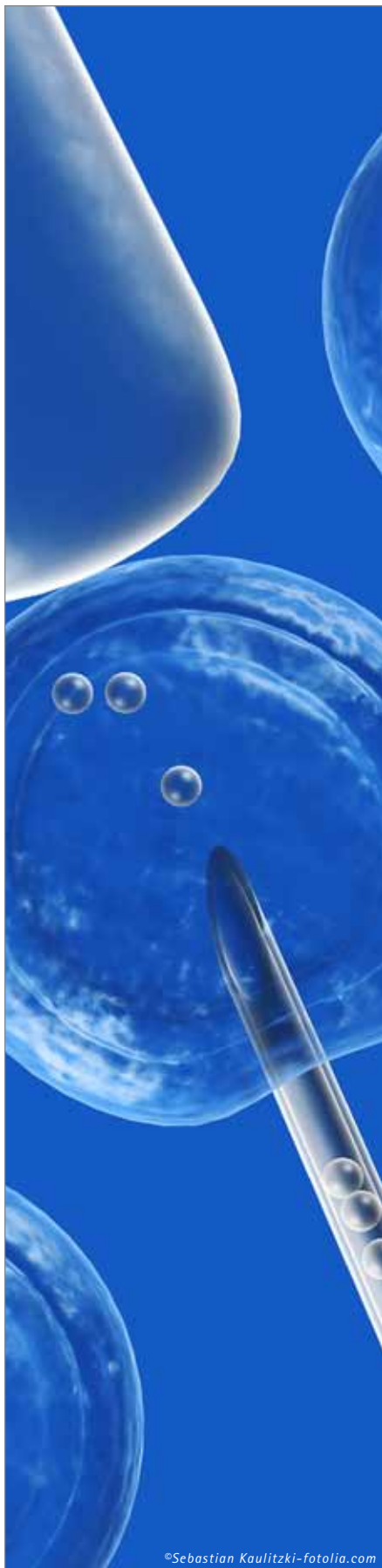
An important factor that attracts business activities and encourages company growth in biotechnology and the pharmaceuticals and the entire Life Sciences is the availability of sufficient qualified staff at the chosen location. The greater metropolitan region of Munich, with its universities and extra-mural research institutions, is very privileged in this regard – even when considered on an international scale.

Aside from the respective departments at the Ludwig-Maximilians-Universität (LMU

Munich) and the Technische Universität München (TUM) there are the three Max Planck Institutes for Neurobiology, Biochemistry and Psychiatry devoted to biology and biomedicine, the Helmholtz Zentrum Munich – German Research Center for Environmental Health (Neuherberg), as well as the universities of applied science in Munich and Weihenstephan. The research done at these centers is as broad as the life sciences themselves. It ranges from cellular and molecular biology and chemistry to nanotechnology, from oncology, cardiovascular and central nervous system diseases to infectious diseases, from interdisciplinary research to highly specialized areas of study.

While the colleges in Augsburg, Landshut, Ingolstadt and Rosenheim are situated within the boundaries of the EMM, they were not included in this study, as their orientation and focus in terms of education and research differ.

The two universities LMU and TUM have enjoyed an additional boost thanks to their successful participation in the „Excellence Initiative“ contest organized by the German government. Until 2011, the LMU has an additional 180 million euros available for various projects. In life sciences these are frequently organized in close collaboration with the TUM. The TUM itself can dispose



©Sebastian Kaulitzki-fotolia.com

of an additional 150 million euros awarded by the „Excellence Initiative“. An example for their collaboration is the „Center for Integrated Protein Science Munich“, an „excellence cluster“ that scientists from the Gene Center Munich (LMU), the TUM in Garching and Weihenstephan as well as the German Research Center for Environmental Health (Helmholtz Zentrum München) are involved in. Aside from these declared clusters, the two universities represent nationally renowned and internationally respected hubs of research, as they are the central co-ordinators for several Collaborative Research Centers run by the Deutschen Forschungsgemeinschaft in the fields of bioscience and biomedicine.

In the meantime the LMU Department of Biology has moved to Martinsried, further concentrating the natural sciences facilities of the LMU in the south, while chemistry and pharmaceuticals as well as the Gene Center in Großhadern have been moved to one central location. The LMU Department of Biology complements the established Max Planck Institutes for Biochemistry and for Neurobiology to form a strong molecular and cell biological pillar in the south. The idea of a „research campus“ in Großhadern/Martinsried is becoming a reality – and will be complemented in the coming years by a biomedical research center.

The TUM, on the other hand, has chosen to make the north of Munich its center of research, moving many departments to Garching and closely linking the historical origins of biotechnology represented by beer brewing, with the most modern approaches to research in molecular structural analysis in the Center of Life and Food Sciences Weihenstephan. All of the research in food and agricultural science is now located in Weihenstephan, with a wide variety of reciprocal links to health and environmental

science – be it with the TUM Department of Medicine or even with the German Research Center for Environmental Health) also situated in the north of Munich. Many of the government agencies responsible for the life sciences are also located in the north of Munich or in Weihenstephan and complete the image of a strong bioscience pillar in the north of the EMM.

The EMM can be particularly proud of its excellent extramural research institutions: the German Research Center for Environment and Health and the Max Planck Institutes for Psychiatry (Munich) and for Biochemistry and Neurobiology (both in Martinsried). While the latter two conduct internationally respected basic research in molecular and cell biology and have already produced Nobel prize winners, the German Research Center for Environmental Health has a strong focus on applicable research that has a singular attraction for partners from the business world. The Munich college landscape would not be complete without the very application oriented universities of applied science. The University of Applied Science Weihenstephan in particular makes a major contribution, producing technically skilled graduates with practical experience gained through internships in biotech and pharmaceutical companies.

According to their own statistics, the life science sectors in the public research institutions in Munich employ some 9,300 staff, of which about 6,000 are employed in research and nearly 3,300 are technical assistants.

## Training and recruiting the next generation of technical specialists

In the life science industry, training and hiring the next generation of skilled specialists is a major consideration. At the end of 2008, there were over 400 vocational trainees employed in the production of pharmaceutical products in the EMM – being trained as chemical and biological lab assistants, chemical technicians, pharmaceutical production technicians, industrial mechanics, electronic technicians, but also as industrial business administration assistants and office administration assistants. In research and development in the fields of natural science and engineering there were 120 vocational trainees working toward becoming administrative assistants or office communication assistants. The wholesale sector, encompassing the trade in pharmaceutical, medical and orthopaedic products, had 180 trainee assistants, especially in wholesale and external trade, office administration, office communication and stock management.

The pharmaceutical and biotech industries also require young pharmaceutical technical assistants (PTA) and chemical technical assistants (CTA) that get their training in vocational schools.

This shows that biotechnology and pharmaceuticals are a job market with a future, providing a wide variety of opportunities for getting vocational training and making a career.

*Source: IHK Munich*

The research landscape in biotechnology and pharmaceuticals provides the basis for a vibrant business landscape, as witnessed by the great number of „spin offs“ from older companies. Over 70 companies said that they were spin offs founded to pursue a life science focus.

## Technology transfer and networks

Spin offs and patent applications are supported by specialised technology transfer stations, which in the meantime are available for practically all institutions. The Max Planck Society has had such an institution for the commercialisation of inventions since back in the 70s, and today it is called Max Planck Innovation. One of the success stories is the licensing of a potential blockbuster drug based on the research of the Martinsried MPI scientist Prof. Dr. Axel Ullrich. Today the substance called „Sutent“ is being successfully marketed by the US group Pfizer.

The technology transfer for the entire life science sector of the Helmholtz Association, including the Helmholtz Zentrum in Munich, is organised by Ascenion GmbH, based in Munich. This institution has a series of remarkable successes to show, and operates a public and effective form of transfer acceleration in its partnering event „BioVaria“. The already mentioned institutions are complemented by the technology transfer offices run by the two universities and the universities of applied science, working together with the patent and legal departments of the companies to speed up the transfer process and make it more efficient. The EMM has visible locations of successful technology transfer including several new business centers, and is expanding existing capacities. Created and designed especially for biotechnology, the two Innovation Centers for Biotechnology belonging to the IZB in Martinsried and Weihenstephan play a special role in the start-up scene. But the growing and established companies can also benefit from these centers, with their specialized knowledge of new technologies and methods. The current expansion of the IZB in Martinsried (building to begin in summer

of 2009) shows the demand for such specialised institutions.

A considerable number of companies that share close networking ties have sprung up around biotechnology and pharmaceuticals; companies including suppliers, commercial enterprises and other services. Of particular note is the large number of more than 50 contract research organizations (CROs) that like suppliers and commercial establishments are part of this study.

Many other consultants, from patent attorneys to marketing specialists for the life science sector, or specialists in lab equipment complete the range of job fields connected to biotechnology and pharmaceuticals; these however are not treated in this study. Also not included in the study are the German and the European Patent Office as well as the numerous supporting public or public-private partnership agencies such as Invest-in-Bavaria, Bayern International, Bayern Innovativ, Munich Business Plan contest, Munich Network, the Ministry for Economics and Labour, and of course the Chamber of Industry and Commerce, the City of Munich and Bio<sup>M</sup> as the



©Gernot Krautberger-fotolia.com

coordinator of the Munich and all-Bavarian biotechnology cluster.

Other important players include venture capital companies, of which several are represented in Munich. These sources of risk capital are vital for biotechnology companies in pharmaceutical research, as the companies often need external financing over a very long period of time.

Munich Trade Fair gives the city a prominent role internationally, and so it is not a coincidence that one of the most important trade fairs in biotechnology and analytics, the „Analytica“, takes place here. Munich is also attractive for other events coordinators, as shown recently by the international Congress of Cardiologists held here in 2008, and by the BIOEurope, the largest European partnering event in Biotechnology and pharmaceuticals, planned for 2010.

### Facts and figures at a glance

The following represents the results of the joint study by the Chamber of Industry and Commerce Munich, The City of Munich and Bio<sup>M</sup> for the year 2008. The underlying survey refers to the „European Metropolitan Region Munich“ (EMM) (see Fig. 1, p. 9). It departs from the study of 2005, which was based on the slightly smaller „planning region 14 including Bernried and Penzberg“. In order to retain comparability, the illustrations for the various reference areas are shown separately. This shows plainly whether changes were caused by the extension of the surveyed area or by changes over time.

The EMM today includes almost 400 companies in the pharmaceutical and biotechnology industry as well as in the life sciences (see Fig. 2). The study includes biotechnol-

ogy and pharmaceutical companies, CROs and other companies in the life sciences. The other firms include suppliers, wholesalers and other companies, for example in veterinary medicine (for definitions see p. 34). The biotechnology industry is subdivided into „SME“ or „not SME“, with „not SME“ referring to branch offices and subsidiaries of international groups and conglomerates, rather than implying the size of the company.

Roche Diagnostics in Penzberg was included in the category „biotechnology, not SME“ because of its increasing biotechnological orientation. Roche Diagnostics calls itself a „biotech company“, which does seem to be justified by the specialized research and production facilities in Penzberg. While the company was still listed among the pharmaceutical companies in the study of 2005, the development of its activities over the

past three years has made the old classification for the Penzberg location seem unrealistic: After all, Roche is currently running the world's largest production plant for therapeutic proteins, mainly for antibodies, in Penzberg. Changing the classification for Roche has major consequences for the statistics in this study. In order to highlight SME-specific characteristics in biotechnology, the study differentiates between „biotechnology SME " and „biotechnology, not SME".

The distribution of the companies across the company categories and geographically across the city and suburbs is shown in Fig. 3 and 4. In Fig. 3 the first two columns represent the results of the studies of 2005 and 2008 as they relate to „planning region 14 including Penzberg and Bernried"; the third column shows the figures of 2008 as they relate to the entire EMM. The number of biotechnology SMEs and CROs has therefore increased significantly over the past three years, while the other categories have remained more or less the same. The extension of the region surveyed to include the entire EMM shows that the distribution particularly of pharmaceuticals, wholesale and other companies in the EMM places a great deal of economic power in the EMM. Most of the biotechnology companies as well as the CROs, on the other hand, are concentrated in planning region 14.

As described in Fig. 4, 29 % of the biotech companies are located within the city limits, with 62 % in the suburbs (planning region 14 without the city) and 9 % in the EMM without planning region 14 (see Fig.1, p. 9). As for pharmaceutical companies, 42 % are located in the city, 36 % in the outlying suburbs (planning region 14) and 22 % in the EMM outside planning region 14. The CROs are particularly closely linked to the city, with 68 % located in the city; another 28 %

	Number of companies/ organisations	Staff	Revenue (in million euros)
All companies	385	20,900	10,500
Biotech, SME	127	2,670	388
Biotech, not SME	23	5,400	2,435
Pharma	55	7,600	3,725
CRO	53	1,700	120
Other	127	4,500	3,850
Research institutions	8	9,300	n.a.
		Incl. research: 30,200	

Fig. 2: Core data for the life science industry in the EMM

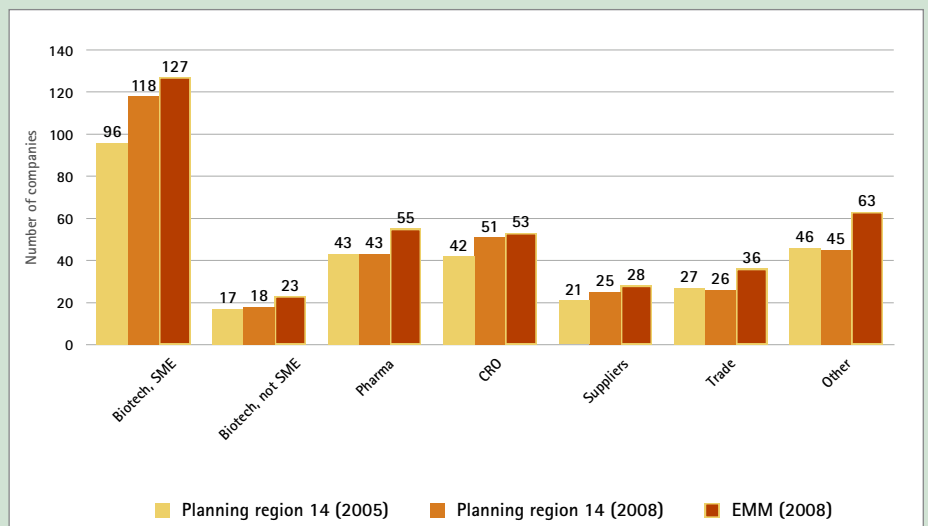


Fig. 3: Number of companies by company category

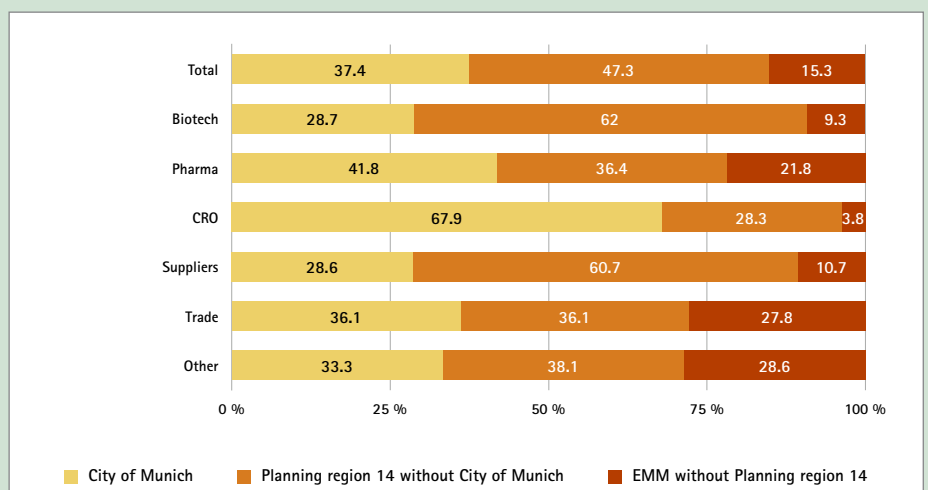


Fig. 4: Distribution of companies by company category in per cent



©fotoflash-fotolia.com

are located in planning region 14 without the city and only 4 % are located in the outside EMM without planning region 14.

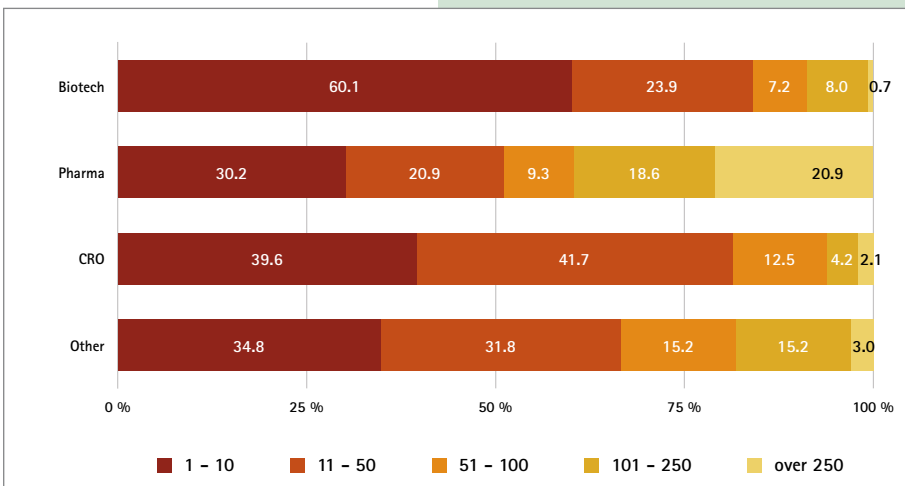


Fig. 5: Distribution of staff by company category

Looking at the size of the companies (see Fig. 5) shows that among biotech companies the number of the companies with just 1 to 10 employees has grown substantially since 2005 (from 49 % to 60 %). This is due to the growing number of new companies: 24 start-ups were launched just in the past three years. 10 % of the Munich biotech companies today already have a staff of over 100 employees. MorphoSys in Martinsried is looking forward to hiring the 250th employee for its Martinsried location alone. Roche Diagnostics in Penzberg is a

special case, as the takeover of the former Boehringer-Mannheim works in Penzberg by the Swiss Mutterkonzern Roche doubled the staff figures to over 4,400 employees. In the other company categories there are no noticeable changes in comparison to the study of 2005.

Most of the large life science companies in the EMM are still pharmaceutical companies. Over 40 % of these employ more than 100 staff members, and almost a quarter have over 250 employees. This reflects the differences in the age of each company and its degree of maturity, as in the previous study of 2005.

Pharmaceuticals are the only established life science firms that can look back on a company history upwards of 50 and up to 100 years (see Fig. 6). These traditional firms make up about 30 % of the pharmaceutical companies. By contrast, only a few suppliers and wholesalers have such a long history. About 75 % of the other companies, 80 % of the CROs and over 90 % of the biotech companies are under 20 years old. As for half of the biotech companies and a good third of the CROs, these companies have been in business for less than 7 years

A total of over 20,000 people work in biotech and pharmaceuticals in the EMM today. There are ca. 2,900 more employees in the biotech and pharmaceuticals workforce of 2008 in planning region 14 than there were in 2005. This represents an increase of about 18 %. The biotechnology SMEs saw an increase of 480 people (+ 22 %) in their number of employees, while the local offices and subsidiaries of major biotech companies ("not SME") employed an additional 600 people (+ 13 %). The pharmaceutical companies experienced slower growth, with about 300 new employees (+ 5 %). The CROs almost doubled in size, adding 800 new employees (+ 89 %). The companies

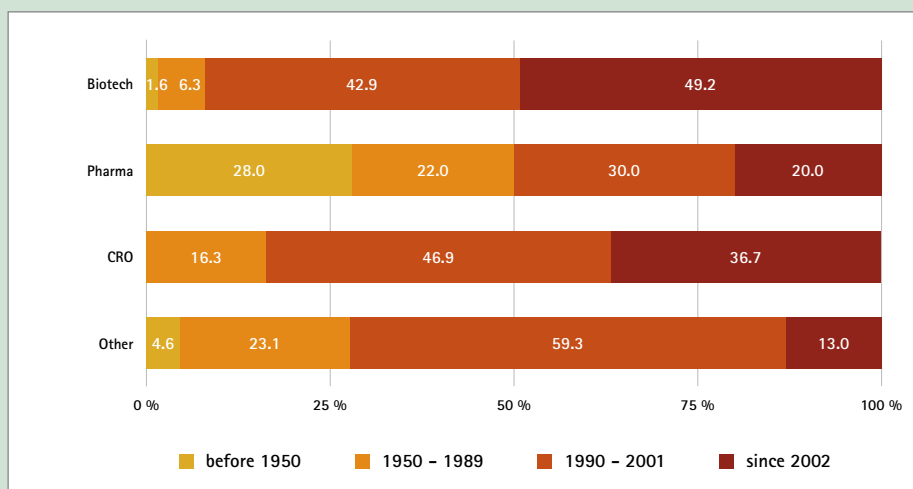


Fig. 6: Distribution of companies by year of founding

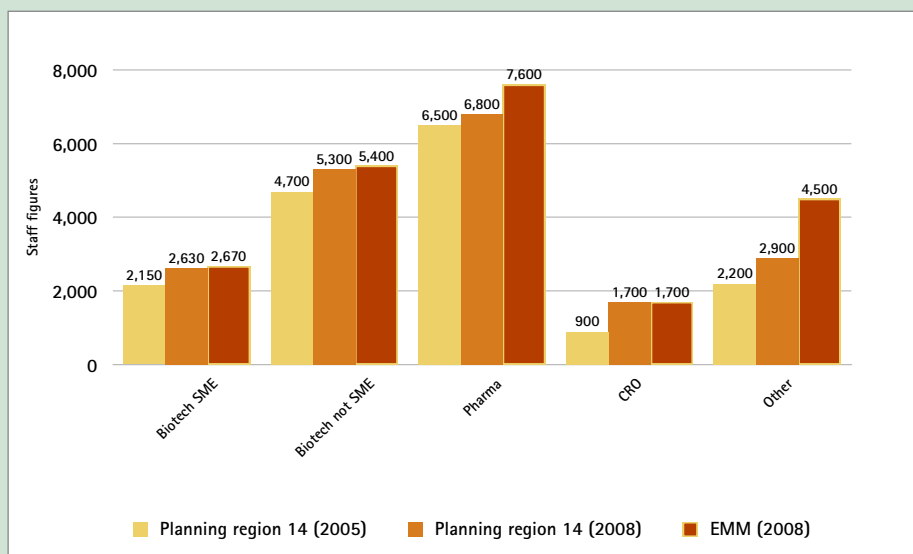


Fig. 7: Staff figures for each company category

listed as „other“, meaning the suppliers and wholesalers, raised their staff levels noticeably (+ 31 %). The extension of the study area from planning region 14 to include the entire EMM accounts for 2,500 additional employees.

According to the information given out by the companies and further calculations, the total revenue generated by all of the companies in biotechnology and pharmaceuticals in the EMM in 2008 amounted to over 10.5 billion euros (see Fig. 8). The pharma-

ceutical companies contributed ca. 3.7 billion euros, die CROs and other companies generated about 4 billion euros and the biotech companies accounted for 2,8 billion euros. Despite a drop in revenue for „other companies“, all company categories enjoyed distinct growth in revenue.

The biotechnology and pharmaceutical industries are very research intensive. Over 67 % of the companies that answered questions about their activities in Munich conduct research and development in the EMM.

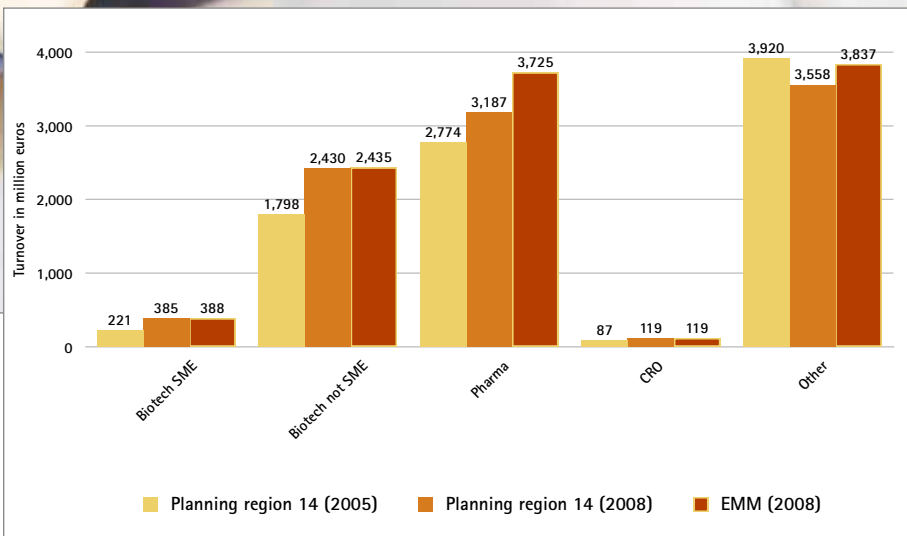


Fig. 8: Turnover in each company category

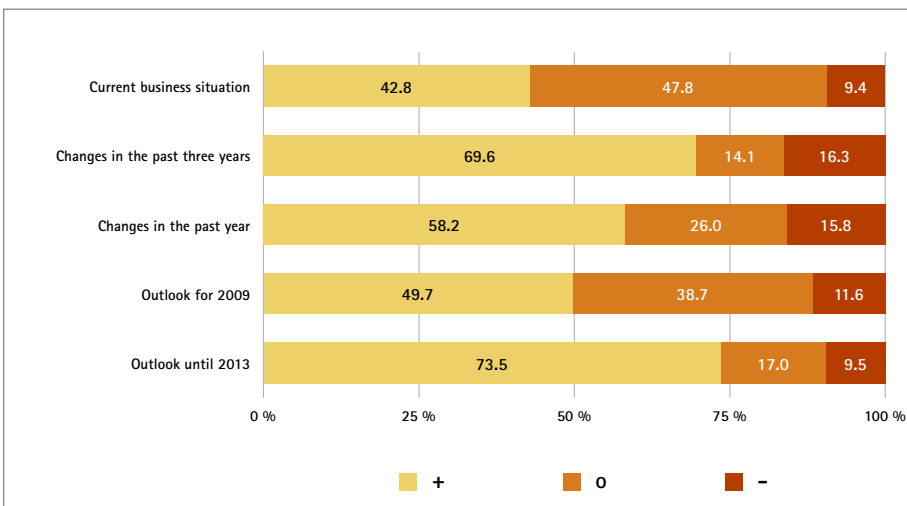


Fig. 9: Assessment of business situation in life sciences

The money spent on R&D by the biotech companies amounted to some 725 million euros in 2008, of which the biotech SMEs bore 312 million euros. The pharmaceutical companies could not provide figures to allow their costs for R&D to be evaluated.

In the survey, companies were asked to assess not only the current business situation, but also that of years past and what they expected the future would bring (see Fig. 9). Overall the results show that there are no major changes compared to the survey of 2005. However, the survey took place at the end of 2008/ the beginning of 2009, when the deepening worldwide economic crisis was not yet as apparent as it is today. Only a closer look at the business assessment in each company category discloses interesting points. The detailed results below provide more information.

## Corporate structures in biotechnology

A total of 150 biotech companies were based in the EMM in 2008, of which 127 were SMEs. The remaining 23 companies are the local offices and subsidiaries of international biotech companies that are listed here as „not SME“.

The biotech industry in the EMM is distinguished by a strong focus on „red biotechnology“, which is the biotechnology related to human or veterinary medicine (see Fig. 10). 70 companies, or almost half (47 %) of all surveyed biotech companies work in the area of drug and diagnostics development. Nine providers of platform technologies with services in drug development were also included in this category.

In a major departure from the study of 2005, Roche Diagnostics in Penzberg, a red biotechnology company, was included under the heading „biotechnology, not SME“ (see p. 12). In order to retain the comparability of the database, the Roche data of 2005 was reassigned to the „biotechnology, not SME“ category ex post to create the figures below. A quarter (26 %) of the companies are working on the development of instruments or reagents for research in biotechnology. A further 14 % are service providers in biotechnology, for instance in the field of DNA analytics or sequencing. 5 % work in bioinformatics.

7 % of the companies are active in the field of agriculture, food and environment; only two of them are involved in „green“, or plant biotechnology.

Two global players in „white“, i.e. industrial biotechnology are based in the EMM, namely Wacker and Süd Chemie. These two companies are planning to shift their chemical

production processes further towards biotech processes and are currently investing heavily in research and development to do so. In addition, they are actively involved in networks created between companies and universities, such as the Bavarian network for white biotechnology (IBP). Three other companies also work in white biotechnology, and they are included in Fig. 10 in the categories „agriculture, food, environment“ or „instruments and reagents“.

As the map shows (Fig. 1, p. 9), about 29 % of the biotech companies are based within the city limits of Munich, 62 % are located in planning region 14 (outside the city) – with a strong concentration in and around Martinsried near Munich – and 9 % in the

EMM (without planning region 14). 131 (87 %) of 150 companies are under German ownership. Neither the distribution of business areas nor the geographic locations of the companies have changed significantly since the study of 2005.

In the past three years, 24 biotech companies have been founded; 2008 alone saw 14 companies starting up (see Fig. 11). Twelve of these are spin-offs from universities or research institutions and nine were hived off from companies.

Most of these new start-ups in the past years have been biotechnology service providers. They provide a very wide range of highly specialized technical development

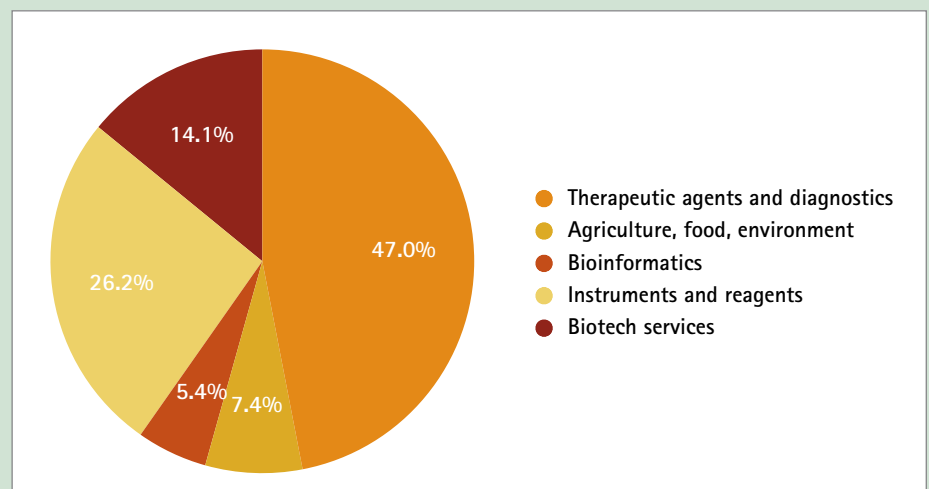


Fig. 10: Distribution of the business areas biotech companies are involved in

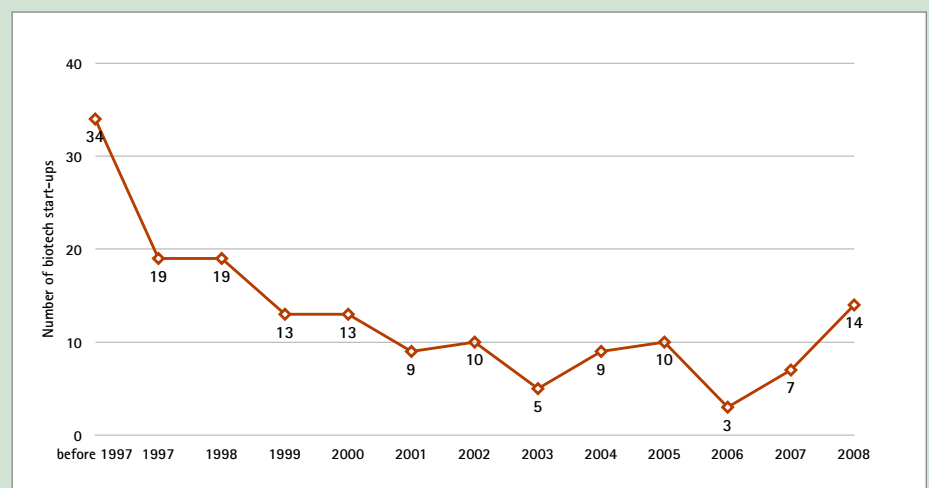
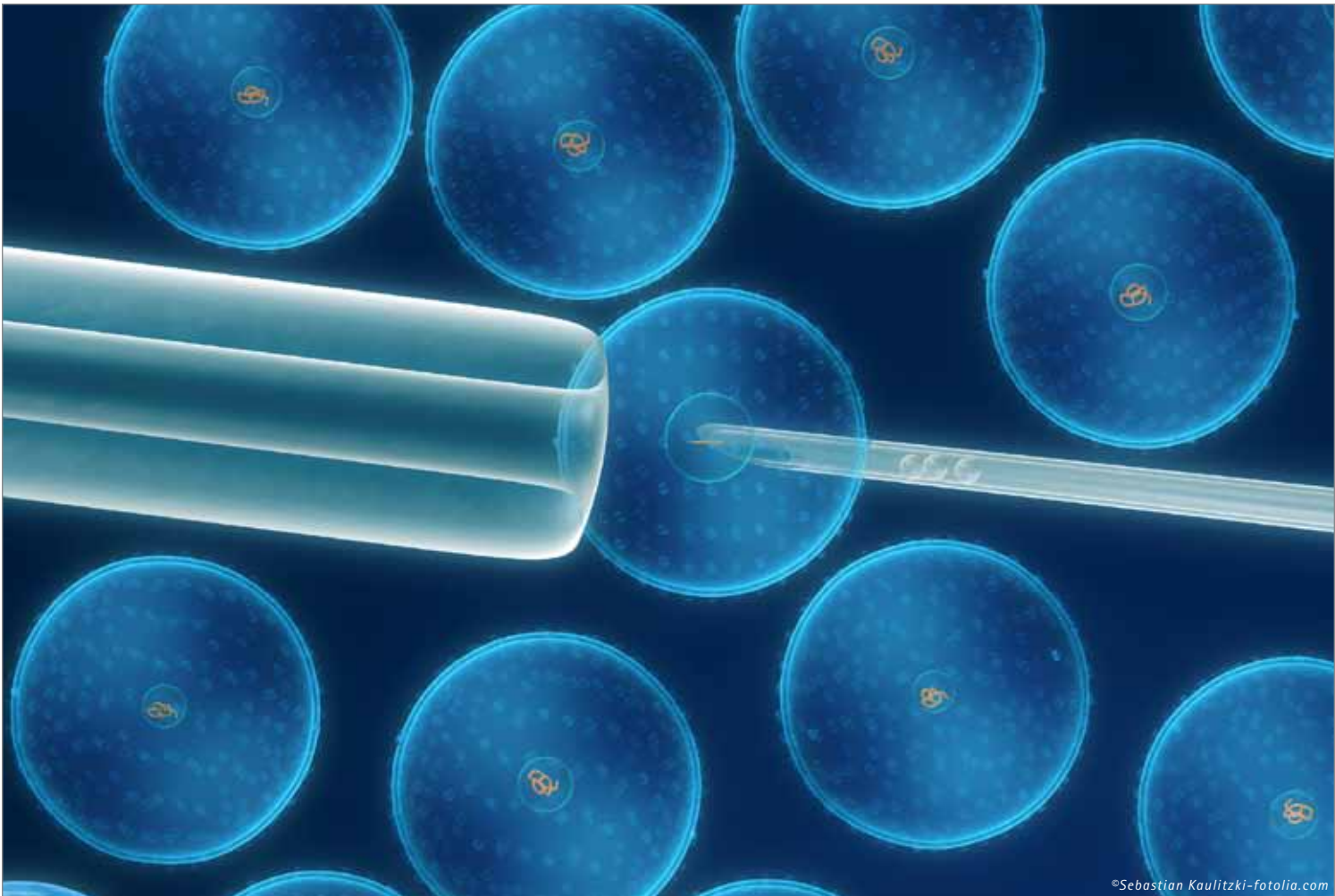


Fig. 11: Number of biotech start-ups



©Sebastian Kaulitzki-fotolia.com

services. Drug development alone has only rarely been the immediate incentive to set up a new business; this is doubtlessly connected to the difficulties involved in securing financing for such companies.

### Distribution and qualifications of staff

The 150 biotech companies in the EMM employ some 8,000 people, 7,930 of whom work in planning region 14. Roughly 85 %, the greatest number, are employed in companies focussing on therapeutics/ diagnostics, followed by 6 % in the field of developing biotechnological instruments and reagents. The greatest growth in terms of new staff has therefore taken place in therapeutics/ diagnostics (see Fig. 12).

About 63 % of the total number of 2,670 staff in biotechnology SMEs are employed in therapeutics and diagnostics development. Almost 20 % of the biotech SME employees work for producers of instruments and developers of specific reagents. The other 20 % are employed in a wide range of areas, from bioinformatics, agriculture, food and environment to biotechnical services.

About 30% of the employees in the 150 biotech companies as a whole work in R&D, 30% in production and 30% in marketing/ distribution (see Fig. 13). Roche in Penzberg, the largest production location for biopharmaceuticals in the world (!), is an important factor in these figures. By contrast, the biotechnology SMEs present a very different picture: More than half of the employees there (58 %) work in research and develop-

ment, while the other 40 % are involved in other areas of management, administration, marketing and distribution, and a still very small number work in production.

An above-average number of women with a university background are employed in the biotechnology industry in the EMM: An average 69 % of the staff in the surveyed companies have a degree from a university. According to the companies, 37 % of these are women, and it is not rare to find women heading the company. To better assess these figures it is interesting to see that according to the OECD (2008), female scientists and engineers make up only 1.2 % of all German employees.

The only longterm analysis of employment figures possible is for the group of biotechnology SMEs in planning region 14, as this is the only group where historical data is available. 2,630 of the overall 7,900 employees are currently employed by biotechnology SMEs. As Fig. 14 shows, there was a change in the employment trend in 2005; this was also predicted in the study of 2005 based on the results of the survey. The increase in employment has continued in the past three years, so that the high employment level of 2002 was almost reached again in 2008. 57 % of the biotechnology SMEs expect the number staff to continue to rise in 2009, 40 % expect staff figures to remain constant, and 3 % think the number of staff will decrease.

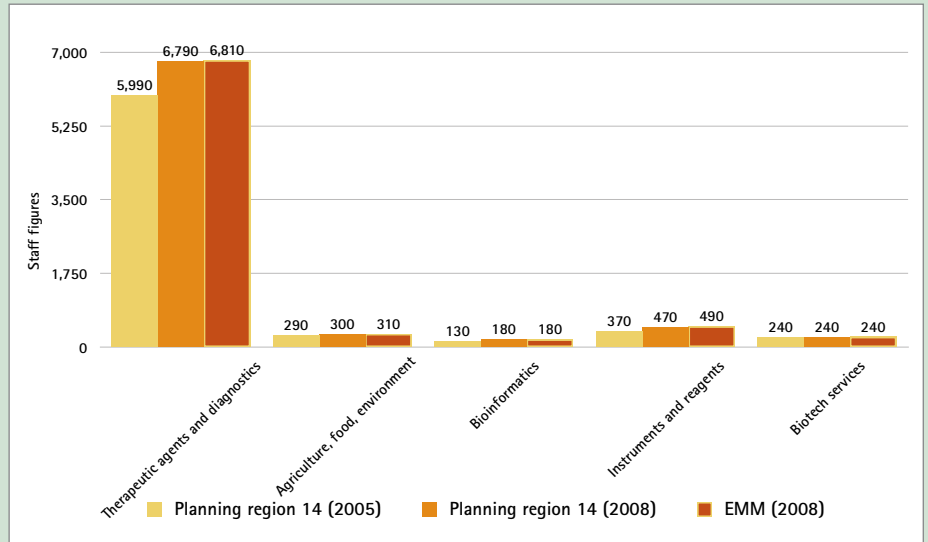


Fig. 12: Distribution of staff in biotech companies by business area

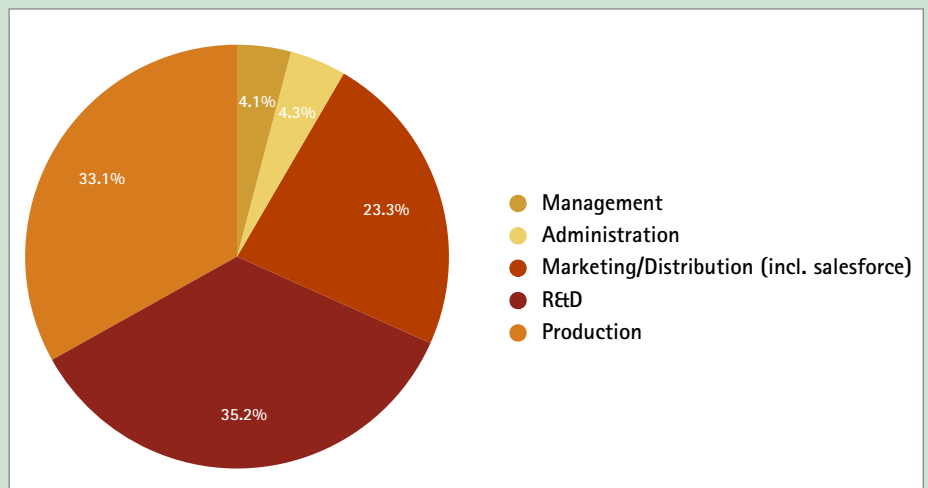


Fig. 13: Distribution of staff in biotech companies by company functions

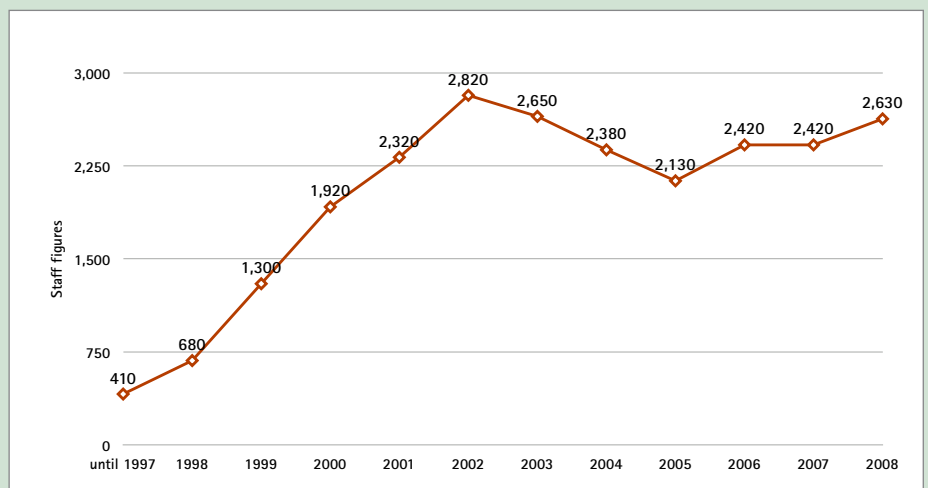


Fig. 14: Timeline of staff figures in biotech SMEs



©richard villalon-fotolia.com

## Cooperation between business and research

Biotechnology is a research-intensive hightech industry that takes its motivation and drive from a globalised research community. Cooperations with other companies and research institutions are vital in order to keep up with the latest technological developments, combine forces and open up markets.

Biotech SMEs in the EMM are currently involved in 163 development cooperations with other companies; a third of these partnerships were begun in 2008. 26 products or technologies were licenced out, while licences for 31 products or technologies were procured. In addition there are about 170 sales and distribution agreements in the EMM.

Fig. 15 shows that most of the biotech SMEs in the EMM collaborate with foreign companies (68 %). 21 % of the collaborations are with German companies, 11 % with companies in the der EMM. Compared to the study of 2005, the degree of internationalisation in business collaboration has increased.

The business environment for setting up new cooperations is currently considered to

be good, as major pharmaceutical companies are seeking promising products to fill their drug development pipeline. This is supposed to balance out the oncoming end of patent terms on top-selling drugs.

A few of the cooperation agreements listed here in terms of figures have really helped to stabilize and promote the positive development of the biotech industrie in the EMM in the past years. Here are three examples of such agreements:

- MorphoSys receives 400 million euros from Novartis from the end of 2007 until 2017 for the joint development of promising antibody products.
- Idea receives 250 million dollars from Alpharma (which has in the meantime been sold to King Pharmaceuticals) from 2007 for joint product development.
- SciTechnology receives up to 250 million dollars from Pfizer and a probably almost as high sum of money from Medtronic for cooperative projects from the beginning of 2008.

By collaborating on development projects the companies in the EMM have managed to open up international sources of finance, generally by taking the role of contractors. Since the number of such cooperations is not endless (the number of possible industrial partners is limited, after all), the total number is far lower than the number of development collaborations with research institutions. In those latter collaborations, the companies in the EMM are usually the clients: A total of 279 cooperations between biotech companies and research institutions, the number has almost doubled compared to 2005. In the area of these academic collaborations there is a totally different geographical distribution than in those between companies (see Fig. 16): 73 % of the cooperations are with domestic partners, and 40 % of the cooperation partners are located within the EMM. This can also be

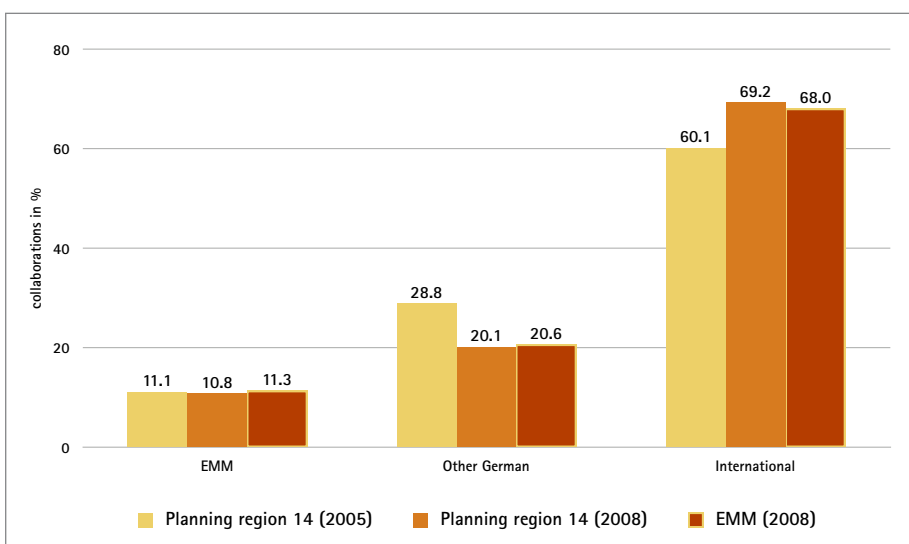


Fig. 15: Geographic distribution of collaborations between biotech SMEs and companies

explained by the fact that most of the companies have their origins in, and very many of the employees were previously at one of the research institutions in the region.

This distribution shows plainly the extent to which the companies benefit from the strong presence of leading research institutions in the region. Collaborations between the business and the scientific communities make Munich a true „cluster“, providing the necessary critical mass for innovation and cooperation to keep the entire industry primed with an uninterrupted stream of new ideas.

Another accepted indicator for the intensity of research in an industry is the number of patent applications. The biotechnology SMEs disclosing information on their patent activities reported having applied for 1,290 patents or patent families so far. More than 520 individual patents have already been granted.

## Developing new products

The focus of the biotech SMEs in the EMM is on red biotechnology, i.e. the development of pharmaceutical products. Drug development is a long, drawn-out process: Going from the first identification of a substance thought to possess medicinal properties all the way to bringing it to market generally takes at least 10 to 12 years. The risk of failure is very great during the entire period. On average in the past years only about 10 % of all substances actually went from the first clinical trial to the market. The maturity of the biotech industry in a particular region can therefore be assessed by where the drug candidates stand in the sequence of the three clinical phases they must past through, and how many products have already been licensed.

In Germany a total of four substances produced by biotech companies have been licensed so far, three in Munich and one in Berlin. This puts the companies in Munich in the lead in Germany. Eligard, an agent to cure prostate cancer, was licensed by MediGene in 2003, making them the first German biotech company to be awarded such a license. In the meantime MediGene has gone on to receive two further international licenses for substances, making it the champion in drug development among biotechnology SMEs in Germany.

Fig. 17 presents the status as of 31.12.2008 and demonstrates the typical ratios between product development in the phases of clinical development and licensing as mandated by law. As they progress through these phases, the field of active and promising product candidates thins out.

In spring of 2009 the two Munich-based companies Fresenius Biotech and its development partner TrionPharma were issued a recommendation for approval by the European Medicines Agency (EMA) for a substance; this is a „trifunctional“ antibody, invented over a decade ago at the Munich

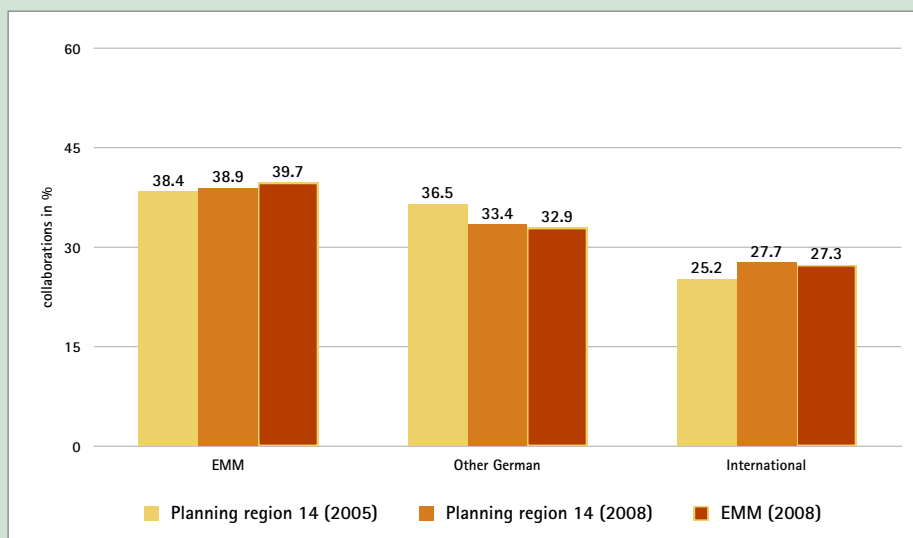


Fig. 16: Geographic distribution of collaborations between biotech SMEs and research institutions

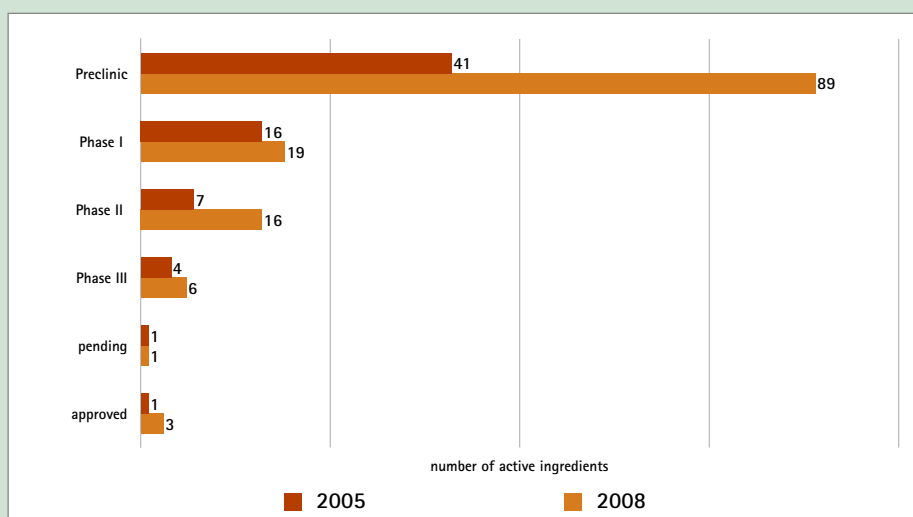


Fig. 17: Ingredient and product pipeline of pharmaceutical developers (only biotech SMEs; number of studies/projects)



Helmholtz Zentrum. The official approval by the EU Commission is considered to be certain following such a distinguished recommendation.

The biotech industry also encompasses other business sectors whose products are highlighted briefly below:

Diagnostics developers have another, shorter licensing process to go through. In the area of human medicine 269 diagnostics products were already on the market; one product is at the end of the licensing process, 22 products are in various stages of development. A large part of the success of these companies lies in the strong presence in international markets: Ca. 43 % of all revenue is generated outside Germany.

The development of the biotech industry has opened up an important new customer base for providers of biotechnological services (sequencing, producing nucleic acid). Today, biotech companies, the pharmaceutical industry and public research institutions each make up a third of their customers. Here, too, export plays a major role, as almost half (49 %) of their business is done internationally.

## Financing

The issue of financing concerns the companies in the biotech industry in various degrees. Companies with marketable products and service are generally relatively independent from external financing. But companies needing long lead times to develop products to bring them to market can hardly survive without external financing. This is particularly true for the companies in drug research, which are strongly represented in the EMM. Several of these companies are listed on the stock market and are financed through the capital market.

As Fig. 18 shows, the volume of finance since the beginnings of biotechnology over ten years ago has varied considerably. The first major peak was based on the euphoria of the „new market economy“, which led to an equally dramatic drop around the year 2000. 2005 and 2006 again yielded somewhat higher volumes of investment, but since then the EMM and the whole of Germany have seen a decline in this type of financing. In 2007 financial investments in planning region 14 amounted to about 150 million euros, and in 2008 they were down to about 100 million euros.

Several biotechnology SMEs have in the meantime been able to procure longterm financial commitments independently of the stockmarket through cooperations with other companies (see p. 20). Two companies were also able to negotiate a new type of „financing on demand“ by international investors in 2008: Micromet was promised the use of 59 million euros „if required“, and MediGene was promised 25 million euros.

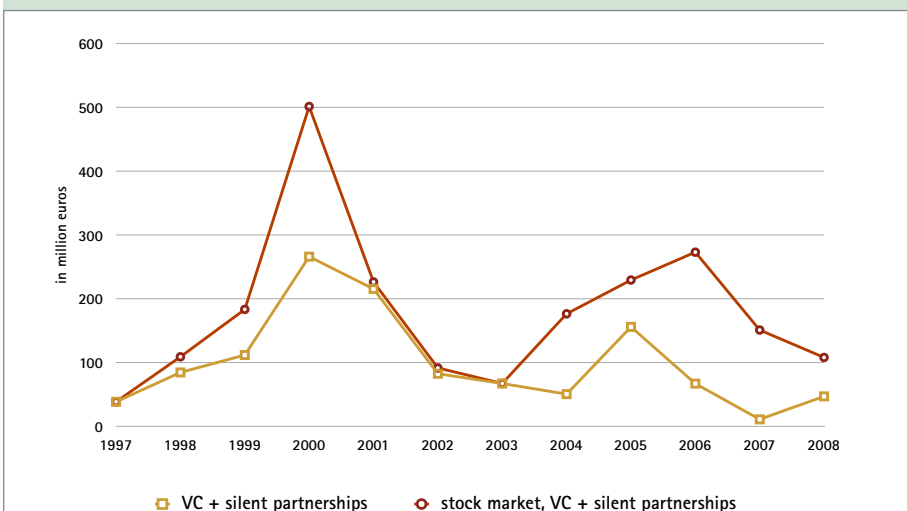


Fig. 18: Financing for biotech SMEs by venture capital (VC) and other external equity capital

## Revenue and investment in R&D

The biotech industry in the EMM generated total revenues of about 2.8 billion euros. In 2008, non-SME biotech companies were responsible for 2.43 billion euros, while biotech SMEs earned about 388 million euros. Ca. 177 million euros were generated by the stockmarket-listed companies 4SC AG, GPC Biotech AG, MediGene AG, Micromet AG, MorphoSys AG, MWG Biotech AG and Willex AG. In 2007, 62 % of the companies in planning region 14 said they had enjoyed an increase in revenue, 8 % noted that they had the same amount of revenue as in the year before and 30 % reported a drop in revenue. With regard to the current business year, biotech SMEs in the EMM are venturing only very cautious estimates.

The expenditures for research and development in biotechnology SMEs are slightly below the total figure of 388 million euros, amounting to 312 million euros. 142 million euros were invested in stockmarket listed SMEs. In 2005 all revenues were reinvested in R&D. In the biotech companies that are not SMEs reported spending 412 million euros on R&D

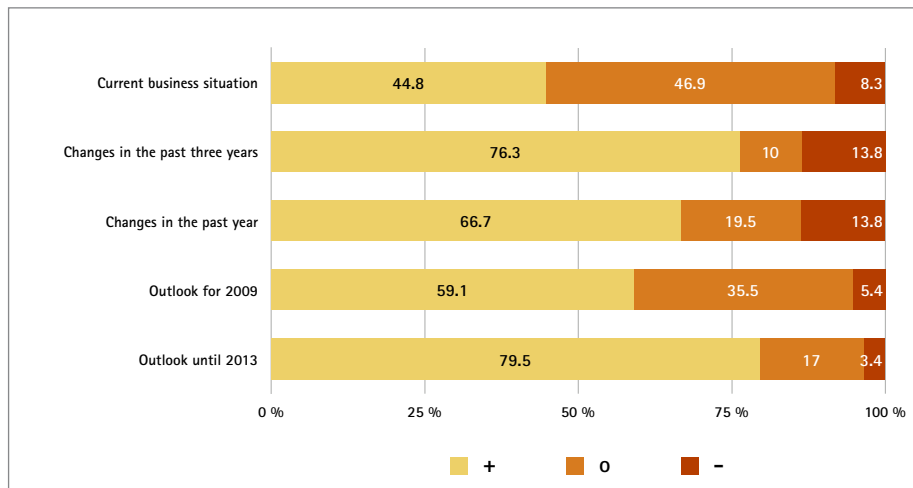


Fig. 19: Assessment of business situation by biotech companies

## Assessing business trends

The overall assessment of the business outlook by the surveyed companies has already been mentioned on page 16. There were no significant changes compared to the outlook of 2005. However, looking just at the biotech companies, the picture is more differentiated (see Fig. 19): In 2008 the biotech companies see the development of the past three years in a far more positive light (76 % compared to 67 % in 2005). The outlook for the coming years is

not quite as optimistic. For 2009 only 59 % expect an improvement, compared to 77 % in 2005. 35 % expect conditions to remain the same, whereas in 2005 the figure was 19 %. For the coming 5 years 80 % expect an improvement, while in 2005 the figure was 85 %.



## Corporate structures in the pharmaceutical industry

A total of 55 pharmaceutical companies working in the area of human medicine were surveyed and interviewed for this study. Roche-Penzberg was included among the biotechnology companies, in the group of not SMEs (see p. 12).

The business areas these companies are involved in are listed in Fig. 20. They are not mutually exclusive, as e.g. a generic drug can

also be a „small molecule“: That is a chemically synthesized small molecule, as opposed to biologically produced, larger protein molecules, the so-called „biologicals“. An herbal medicine can also be an „OTC“ drug. „OTC“ stands for „over the counter“, and only describes how the drug is sold, namely without a prescription. It should be noted that the companies were not weighted according to size. Smaller companies in particular generally concentrate on niche products and OTC drugs, or herbal or homoeopathic drugs. The hurdles that these drugs must pass before

they are marketed are far lower than for prescription drugs. Apart from the field of human medicine, the pharmaceutical companies are to a lesser extent also involved in a series of other areas (see Fig. 21). Food supplements play a notable role, making up 15 %.

The pharmaceutical industry in the EMM includes a number of local sales offices belonging to international pharmaceutical companies. This is reflected in the activities of the companies located in the region (see Fig. 22): 95 % of the companies here are involved in marketing and distribution and 39 % are engaged in production. However, a surprising 59 % of the companies conduct research and development. As for the employees, a third work in production and just over 20 % are in research and development (see Fig. 22). This represents a major difference to the biotech companies: In the biotech SMEs about 60 % of the employees are responsible for research and development, whereas in the pharmaceutical companies just over 20% work in R&D.

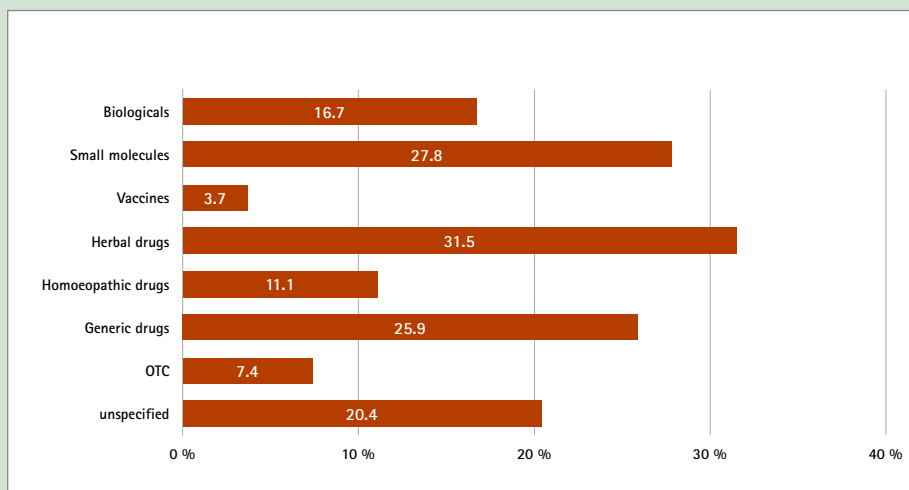


Fig. 20: Business areas of pharmaceutical companies in human medicine (multiple answers possible)

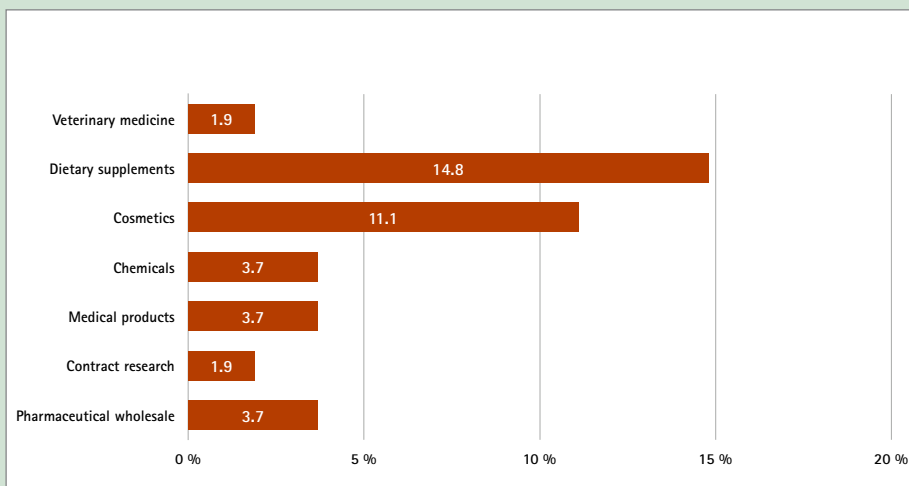


Fig. 21: Other business areas of pharmaceutical companies (except human medicine; multiple answers possible)

In the pharmaceutical industry, also, a large number of the highly qualified staff are women: The companies said that they employed an average of 45 % staff with an academic background, and that 46 % of these were women.

Of the firms that answered whether they were planning to grow their staff, 38 % said they were planning to increase their number of staff, 54 % said the number would stay the same and 8 % said staff would be reduced.

The small and mid-sized pharmaceutical companies in the EMM have customers based mostly in Germany (73 %, see Fig. 23). They typically supply them through whole-

sale channels, i.e. for the sale of drugs for established medical practices.

The revenue generated by the pharmaceutical industry in the EMM amounts to roughly 3.7 billion euros. In planning region 14 revenues have risen by about 15 % over the past three years, from 2.8 billion euros to about 3.2 billion euros. Information on investment in R&D in the EMM could not be extracted from the questionnaires, as the pharmaceutical companies do not break down these costs by region.

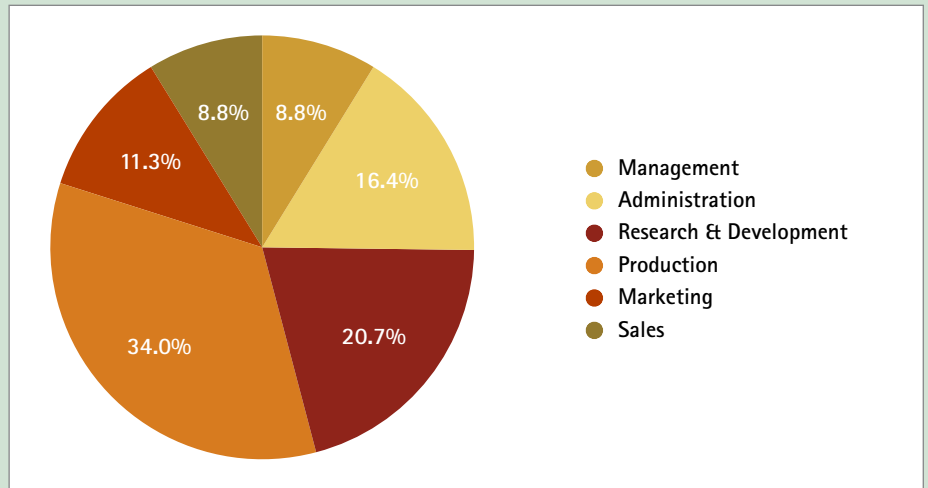


Fig. 22: Distribution of staff in pharmaceutical companies by company functions

## Assessing business trends

The pharmaceutical companies assess their current business situation slightly more positively on average than the biotech companies do (50 % compared to 45 % consider the situation to be good). But the pharmaceutical companies are less optimistic with regard to their future business development, and also see the development over the past years less positively (see Fig. 24).

Pharmaceutical companies are impacted more than those in biotechnology by changes in budgets for public health in the context of public health reform, and by general consolidation tendencies in the pharmaceutical industry. In addition, many patents of top-selling drugs are running out and there is a high level of uncertainty among the pharmaceutical companies which new products will be able to balance out the losses in sales.

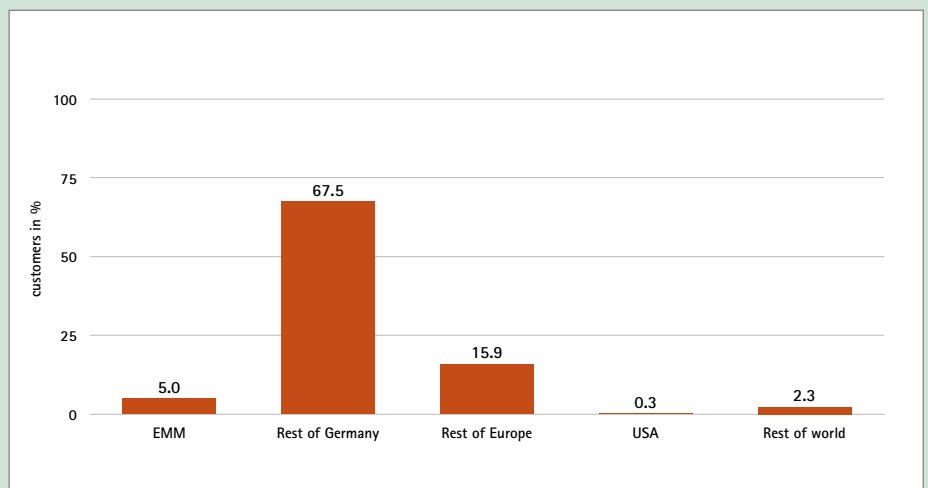


Fig. 23: Geographic distribution of the customers of SME pharmaceutical companies

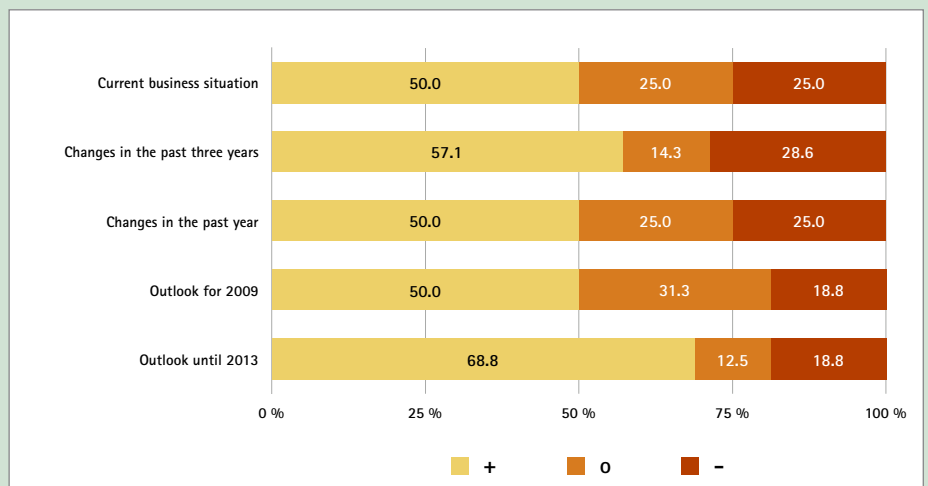


Fig. 24: Assessment of business situation by pharmaceutical companies



### Corporate structures in CROs

**T**he contract research organizations (CROs) provide their services exclusively in the field of drug development, carrying out clinical trials for biotech and pharmaceutical companies. Since the CROs are playing an increasingly important role for these companies, they were looked at separately in this study – as in the preceding study of 2005.

There are 53 CROs located in the EMM, of which 51 are situated in planning region 14. The two remaining CROs are too small to be of statistical relevance. In 2005 there were 42 CROs in planning region 14. 84 % of the CROs were founded or opened offices in the EMM after 1990. Over two thirds of these companies are located within the city limits of Munich.

Since clinical trials are increasingly being carried out globally and patients or testers belonging to different ethnicities and cultures must be included, international companies find it important to carry out trials also in Europe. This may be one of the reasons why many international CROs have opened an office in the EMM. Today 1,700 people are employed in CROs, 2005 the figure was 900. The majority of these employees work in clinical research and monitoring (see Fig. 25). On average 67 % have a university degree; women are clearly in the majority, making up 59 %. With regard to the outlook for staff figures, 56 % of the companies expect to grow their staff, 38 % expect the numbers to remain the same and 6 % expect staff to be downsized.

Most of the CROs' customers are in the pharmaceutical industry (see Fig. 26). However, compared to the study of 2005 there has been a slight shift towards biotech companies, which now account for a quarter of the contracts for clinical trials and their monitoring (2005: 17 %). At the same time, only about 17 % of the customers are located in the EMM.

The revenues generated by CROs amount to a total of 119 million euros. The study of 2005 reported a total of ca. 87 million euros in revenue.

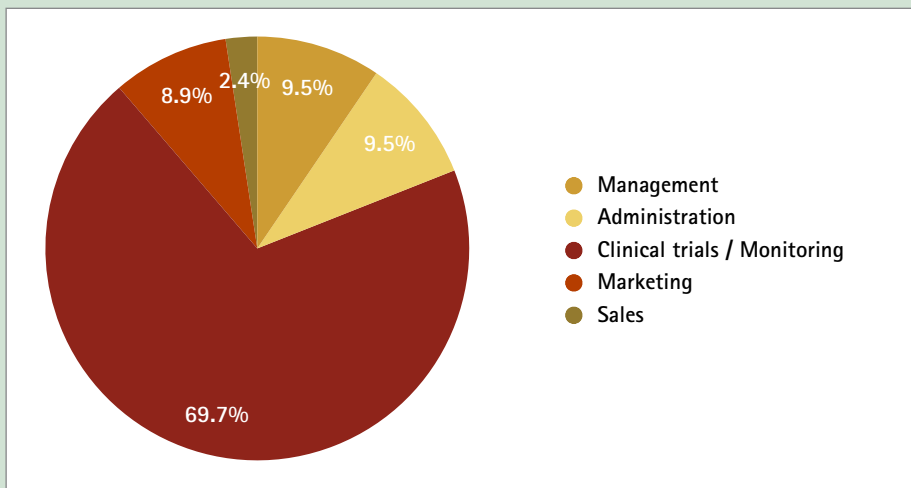


Fig. 25: Staff distribution in CROs

## Assessing business trends

The CRO business has clearly expanded in the past three years. But when asked to assess their situation, CROs are rather pessimistic (see Fig. 27): They consider the business climate to be much worse than they did in 2005. Only 23 % consider the current situation to be good, in 2005 that figure was 54 %. 40 % saw an improvement in the past three years (2005: 67 %), and 33 % in the past year (2005: 58 %). In 2009 43 % are expecting things to improve (2005: 64 %), and 62 % are optimistic about the next 5 years (2005: 73 %). 14 % expect things to get worse this year; in 2005 only 4 % did.

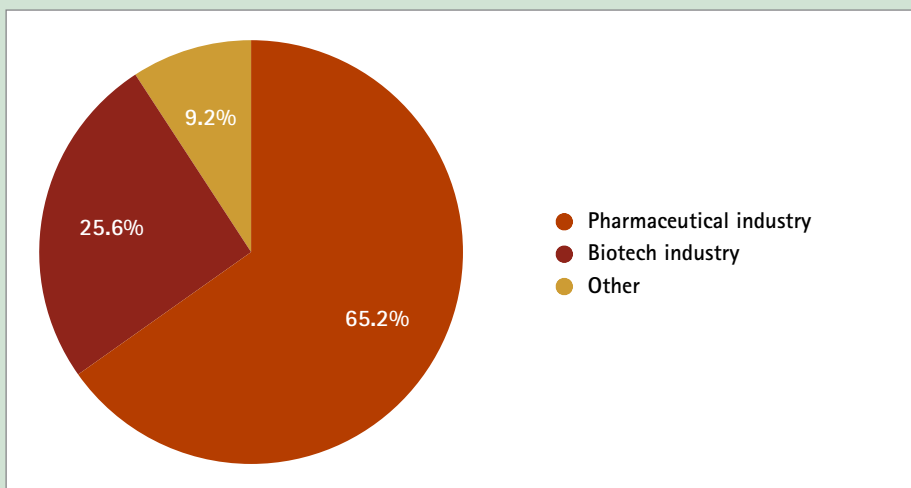


Fig. 26: Customer base of CROs

The reasons for this outlook and assessment of the current situation by the CROs are open to speculation: Perhaps their particularly strong international corporate integration and the uncertainty connected to the economic and financial crisis could play a role in their generally sceptical outlook.

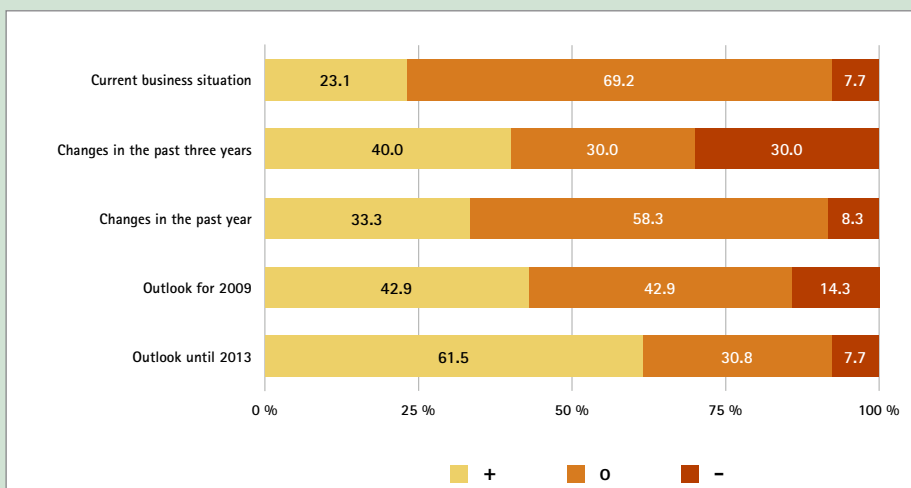


Fig. 27: Assessment of business situation by CROs



## Corporate variety among the other life science companies

Next to the biotech and pharmaceutical companies and the CROs there are 127 other life science companies situated in the EMM. Broadly involved in the pharmaceutical and biotech industry, they employ over 4,500 people.

This group of other life science companies includes 28 suppliers and 36 wholesalers (see Fig. 28). It is difficult to define exactly which suppliers belong to the biotech and pharmaceutical industry. This study therefore only includes suppliers that provide a

majority of their products (> 50 %) only to these industries. So suppliers of laboratory equipment were included, while suppliers of IT and office materials were excluded.

Finally, companies focusing on food supplements and other medical products were included, as well as companies in veterinary medicine and contract manufacturing organizations (CMOs) producing active pharmaceutical ingredients under contract for biotech or pharmaceutical companies. Companies producing only cosmetics were not included – but several firms said that cosmetics were one of their areas of business. Due to the heterogeneity of the other life science companies the range of their activities in the region is very wide. Research and development are playing an increasing role, as in 2005 only a quarter of these companies said they were engaging in R&D. Today, 45 % of these companies in planning region 14, and 48 % in the EMM have ongoing R&D. The portion of manufacturing firms among these other life science companies in the EMM is 32 %. Most of these are located in the EMM outside planning region 14. In planning region 14, only 15 % of the other life science companies are manufacturing companies. Most of the companies in the region engage in marketing and distribution – a total of 80 %, just like in 2005.

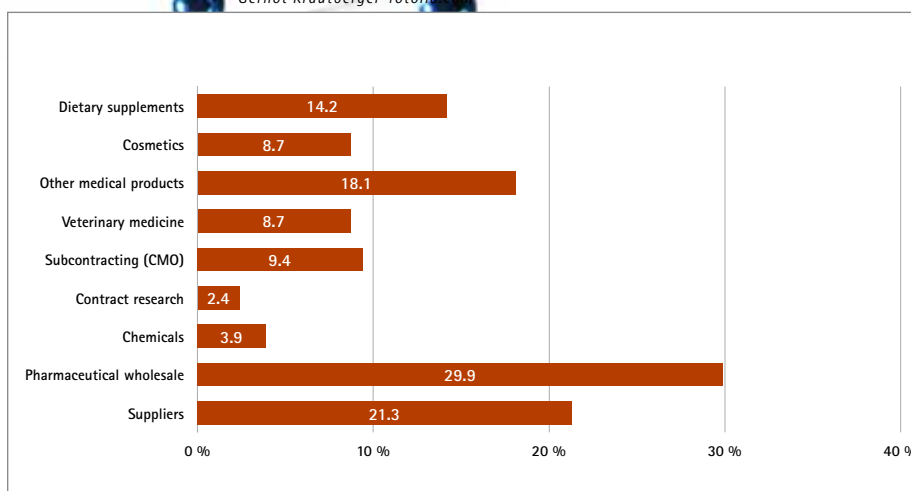


Fig. 28: Business areas of other life science companies (multiple answers possible)

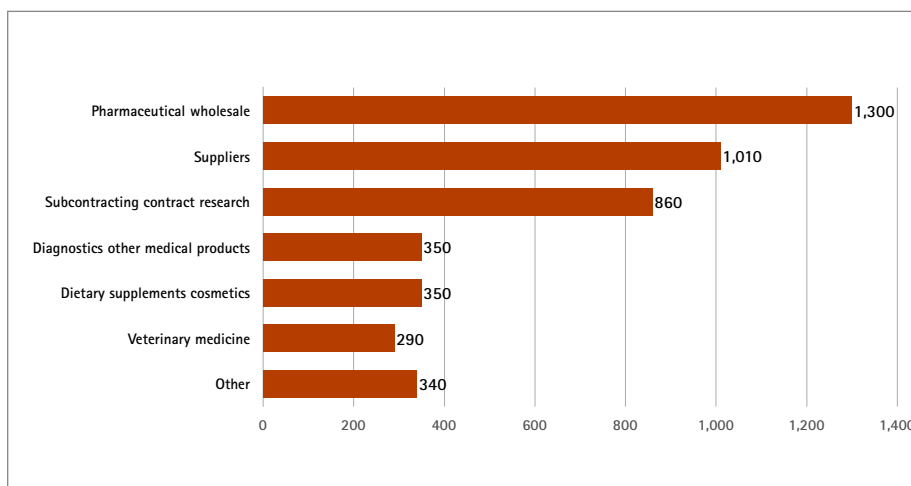


Fig. 29: Distribution of staff by business areas

The other life science companies employ over 4,500 people in the EMM (see Fig. 29). Suppliers and wholesalers provide most of the jobs, with company sizes ranging from the tiny two-person outfit to the international conglomerate. Reflecting what the companies do, main areas of employment are in marketing, distribution or sales (30 %) and 33 % in production. Ca. 9 % are employed in R&D (see Fig. 30).

Two thirds of the customers of the other life science companies are located in Germany, while about a quarter of the customers are

international (see Fig. 31). Here there is no significant departure from the results of the study of 2005.

Revenue in these companies makes a major contribution to the total volume of revenue generated in biotech and pharmaceutical companies. In 2008 in the EMM it amounted to ca. 3.8 billion euros, with 3.6 billion euros in planning region 14. In the study of 2005 the revenue of these companies in planning region 14 was about 3.7 billion euros, so there has been no significant change in the past three years.

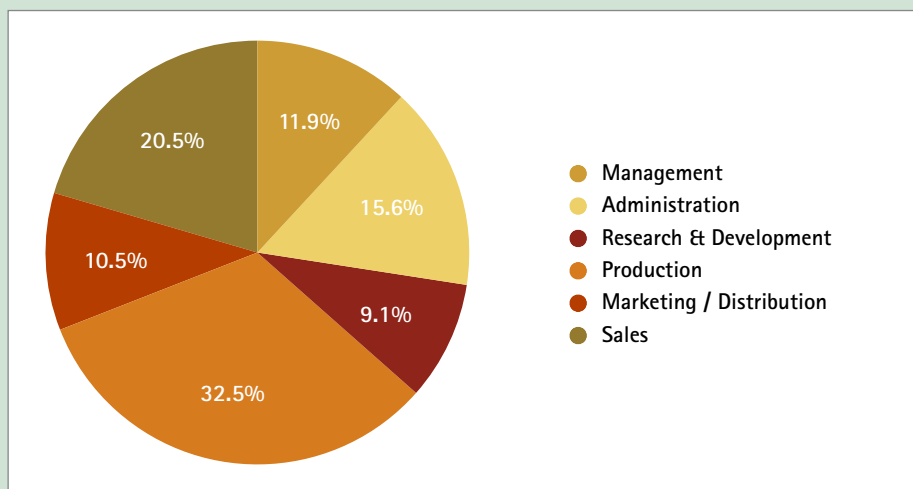


Fig. 30: Distribution of staff in other life science companies by company functions

## Assessing business trends

Comparing what the other life science companies say about the business situation and how they see the future with the study of 2005, there are several changes (see Fig. 32): Far fewer companies saw an improvement in the past year in the survey of 2008 (2008: 53 %; 2005: 70 %). This is also true for their expectations of the coming year (2008: 26 %; 2005: 58 %) or for the next five years (2008: 62 %; 2005: 83 %). This company category is also the least optimistic 2009. As in other industries, the suppliers are always the first ones that must be prepared for a downturn.

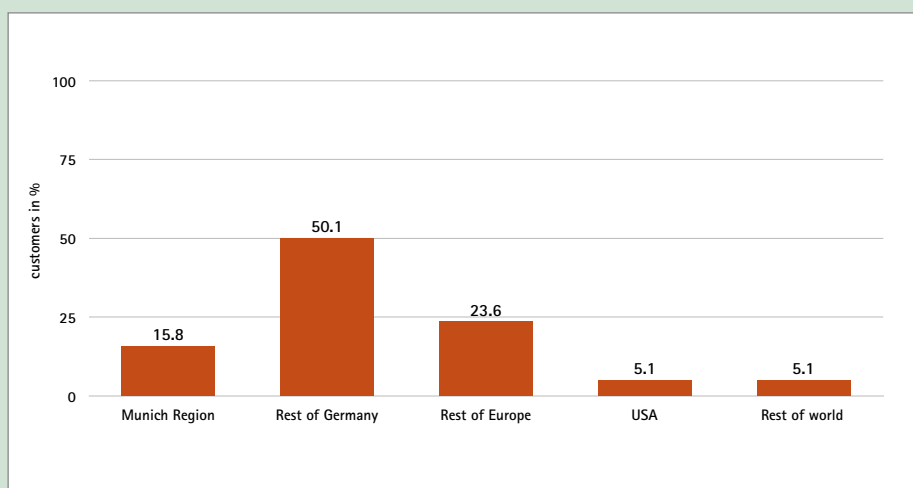


Fig. 31: Geographic distribution of customers of the other life science companies

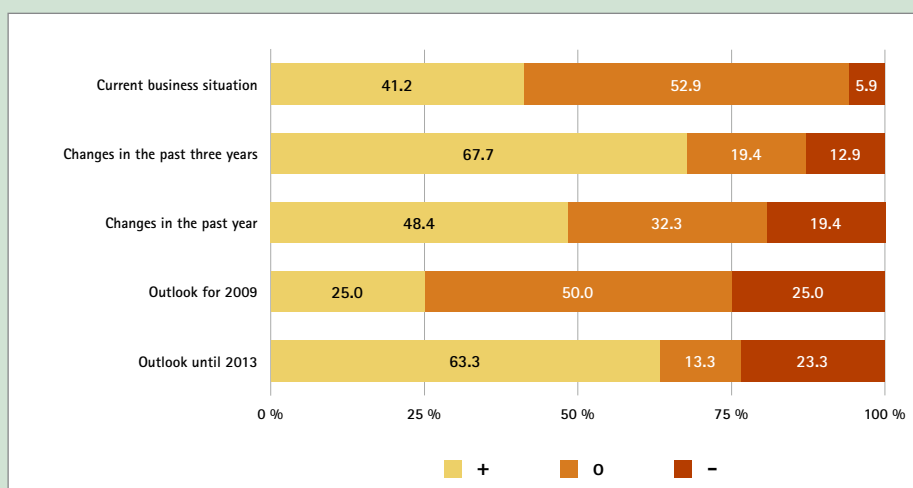


Fig. 32: Assessment of business situation by other life science companies

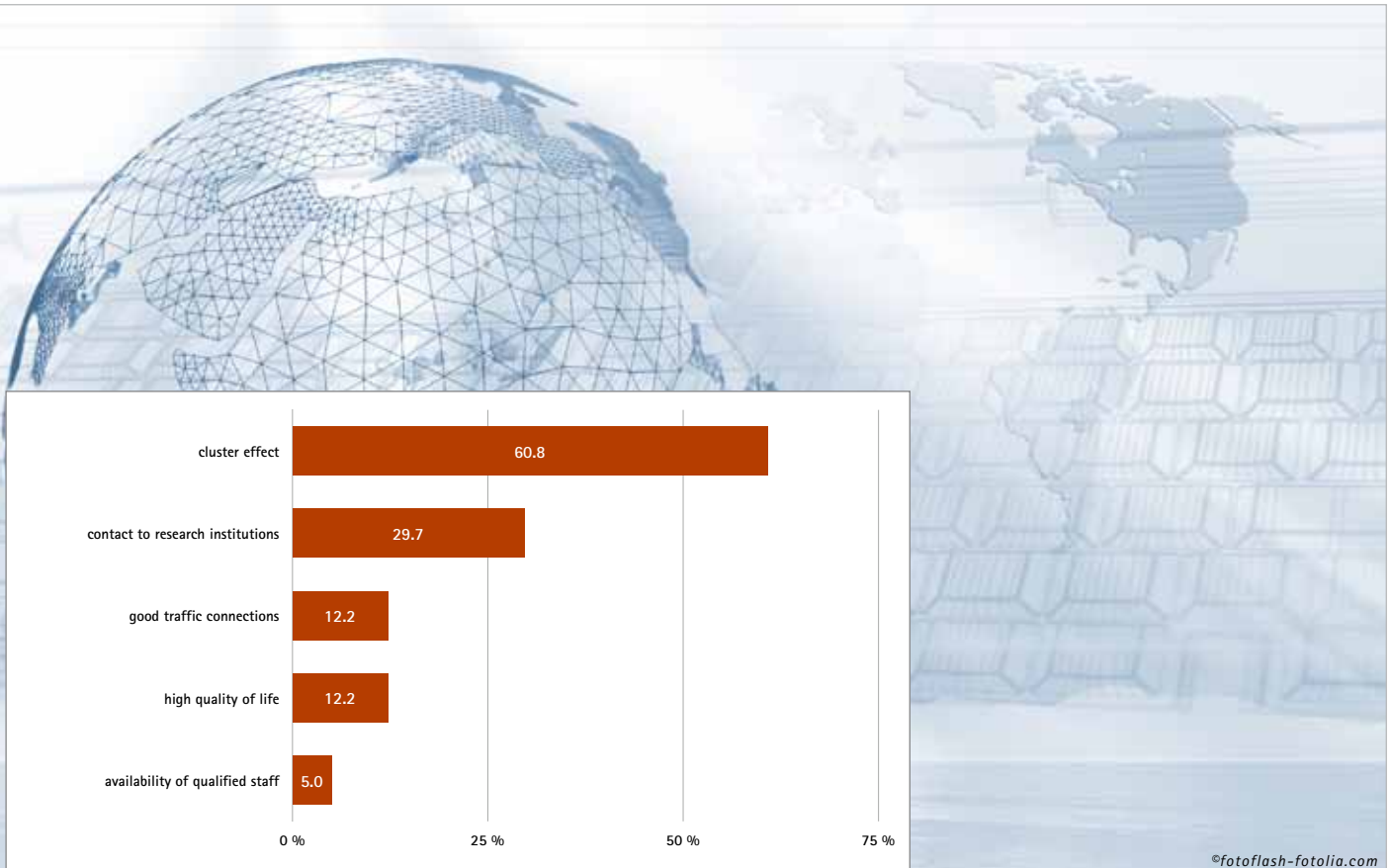


Fig. 33: Strengths of the EMM as seen by the companies (frequency of being mentioned)

The companies and research institutions located in the region were questioned on the general quality of the EMM as a business location. The results of the 2008 survey reaffirm the findings of the preceding study of 2005, namely that the life science industry is generally very satisfied with this location. The scope of the questions included:

- Availability of office and laboratory space
- Availability of qualified staff
- Proximity to suppliers
- Proximity to customers
- Contact zu research institutions
- Rents
- Personnel costs
- Trade tax and municipal duties
- Traffic infrastructure
- Infrastructure for children
- Arts and leisure
- General acceptance of biotechnology
- Cluster effect

In comparison with 2005 it is striking to see that the „cluster effect“ factor – meaning the special ability of all agents to network thanks to the physical proximity accompanied by the focused coordination of measures to continuously raise the level of activity and improve the quality of networks – has risen from 51 % (2005) to 62 % (2008). The „contact to research institutions“ on the other hand has dropped by 10 percentage points compared to 2005, but continues to be considered a strength of the region. Possibly some of the more mature companies find that physical proximity no longer plays as important a role as it did in the founding years. The valuation of the other strengths of the location has not shifted at all compared to the study von 2005 (see Fig. 33).

The list of weaknesses of the location is headed by the cost of living. In 2005 this was noted by 61 % of those responding, and in 2008 by 57 % (see Fig. 34).

While the list of strengths still contains the same percentage of people satisfied with the „good traffic connections “ as in 2005, the opposite, namely „bad traffic connections“ has shot up from 6 % to 14 %. This must surely refer to the incomplete subway connections to Martinsried, as well as the difficulties involved in reaching the airport from this area using public transportation. Also of note is that a „lack of qualified staff“ was mentioned by 10 % of the respondents. The proximity to a large number of research institutions is helpful in bridging short-term gaps. However, it seems that the companies are increasingly competing for this pool of staff.

For an overview of how the companies and research institutions evaluated the location factors, see Fig. 35.

The basic satisfaction of the companies also becomes apparent in the answer to the question whether they are planning to relocate the company or parts of the company to other locations (see Fig. 36). Here there are no changes compared to 2005: The majority of the companies are planning to remain loyal to their location in the EMM.

This means that a stable and active network of a wide variety of firms in biotechnology and pharmaceuticals as well as research institutions has become firmly established and has developed positively. The cooperations between these agents in the EMM are becoming more intensive and more international. The companies and research institutions continue to see their future in the EMM.

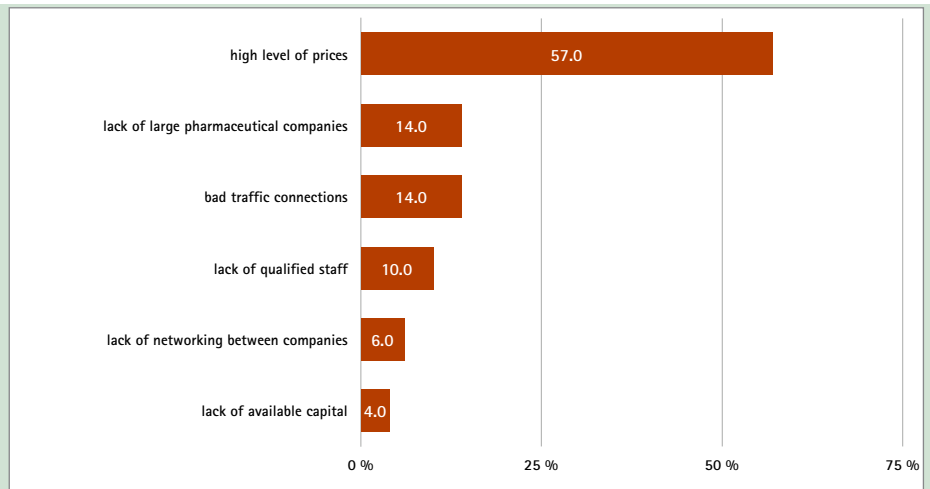


Fig. 34: Weaknesses of the EMM as seen by the companies (frequency of being mentioned)

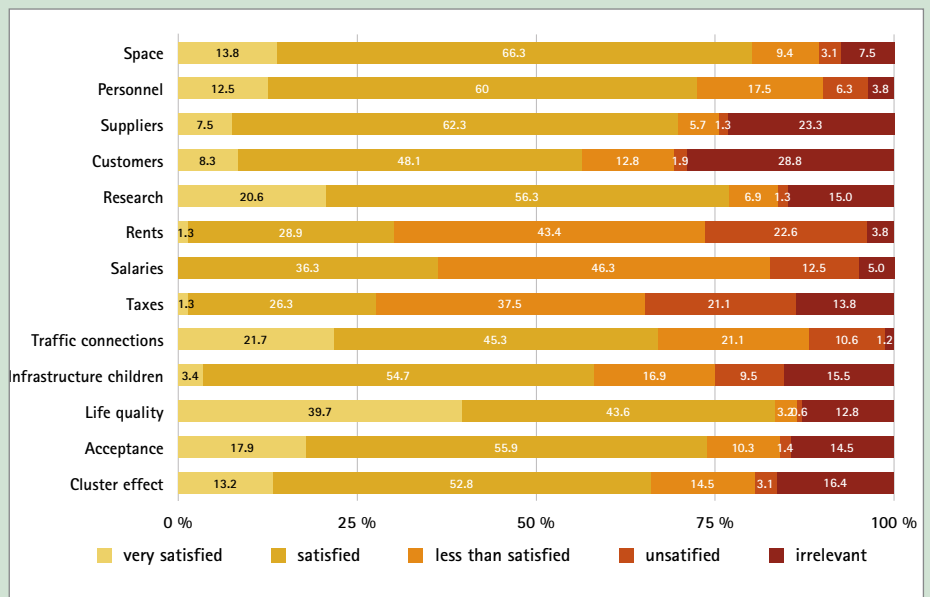


Fig. 35: Assessment of the location factors at a glance

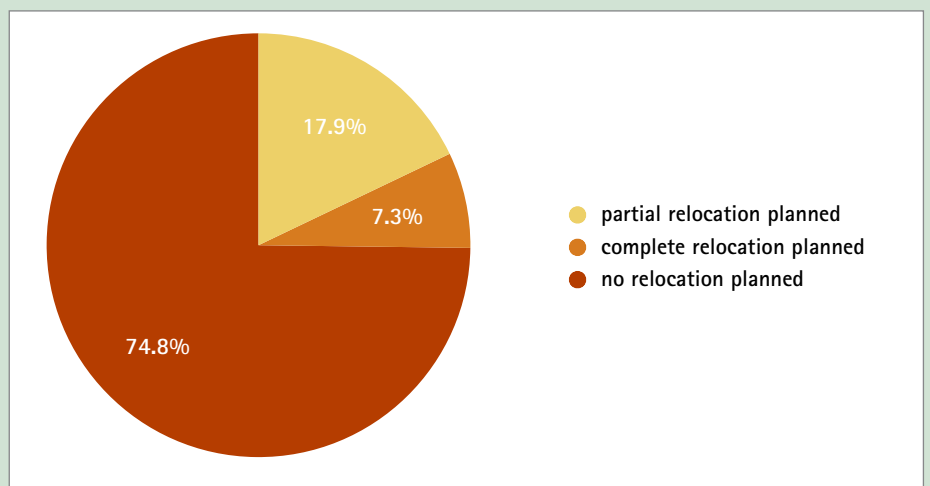


Fig. 36: Company loyalty to the location



©frankoppermann-fotolia.com

### Base data

This study is based on all of the companies who were registered with the Chamber of Industry and Commerce for Munich and Upper Bavaria in November 2008 as companies engaged in biotechnology and pharmaceuticals, as well as the Bio<sup>M</sup> GmbH address database. Address details were completed and refined by online research. Companies in biotechnology and pharmaceuticals as well as other life science companies such as wholesalers, CROs, suppliers and companies in the field of vet-

erinary medicine were contacted by mail. Companies in medical technology were only considered in individual cases, when they stood in close connection with pharmaceutical development or the development of biotechnological equipment.

The regional planning base for this study is the European Metropolitan Region Munich (EMM), (see Fig.1, p. 9). The term „Metropolitan Region“ was coined in the mid-90s by the German Conference of Ministers for Spatial Planning (MKRO). Metropolitan regions are larger than the regional and fed-

eral state planning regions and consist of a densely packed inner core and the surrounding connected area. The study on the Biotech and Pharmaceuticals Region Munich 2005 studied the „planning region 14“ and the towns of Bernried and Penzberg. Planning region 14 includes the state capital Munich as well as the counties of Munich, Freising, Ebersberg, Erding, Starnberg, Landsberg am Lech, Fürstenfeldbruck and Dachau. In order to present developments since 2005, comparisons were made on this basis.

After evaluating the returned questionnaires and doing extensive research, 385 companies were identified as belonging to the circle of life science companies. They form the basic population of this study. The locations of 326 of these companies are located within planning region 14, and the other 59 are in the EMM outside of planning region 14. The earlier study comprised 289 companies in planning region 14.

Number of surveyed companies	2005	2008
Total	289	385
City of Munich	113	144
Planning region 14 (outside the city)	176	182
EMM (outside planning region 14)	–	59

## Data collection

### The survey

The analysis took place on the basis of a written complete inventory count towards the end of 2008.

### Response

The 385 companies polled produced a spontaneous response rate of ca. 20 %, which was increased to 67 % by making telephone calls in January and February 2009 and doing additional research. The rate of response for wholesalers, suppliers and other life science companies came to 40 %, pharmaceutical companies to 58 %, CROs to 83 %, biotech companies not SMEs to 68 % and biotechnology SMEs to 87 %. In addition the eight research institutions in the region dedicated to the field of life sciences were included in the survey.

Detailed qualitative information was gleaned through in-depth interviews with 12 company representatives and 5 from the research facilities. This information provided the underpinnings to interpret the quantitative data and helped identify trends and corroborate developments through concrete examples.

### Estimation procedure

The number of employees in firms who did not respond and whose staff figures could not be determined through the Internet was defined as 10, based on the fact that these companies tended to be small businesses. Revenues were determined by checked off revenue categories. The total revenue was calculated using the mean average values of each checked category. Revenue was calculated in relation to staff figures, based on figures for those companies who had provided information on their staff and revenue, creating a figure for average revenue per staff member for each category of company. The average per staff revenue was then multiplied by the total number of employees.

As with revenue, R&D costs in biotech companies were calculated as average per staff costs and then multiplied by the total number of staff in companies doing R&D. For companies not listed on the stockmarket revenue and R&D costs were calculated as described above. Revenue and R&D costs of stockmarket listed companies were then added to calculate the total sums.

In the case of collaboration, internationalization, patents etc. such calculations were not possible; here the available figures were used without revision.

## Evaluation

For the evaluation, the companies were grouped into the following categories:

1. small and mid-size biotechnology companies (biotech SMEs) including the local offices and subsidiaries belonging to international biotech groups (not SME)
2. pharmaceutical companies
3. CROs
4. other life science companies including suppliers, dealers, and companies from neighboring areas such as dietary supplements, veterinary medicine, selected areas of medical technology or cosmetics.

Some of these categories were subdivided further – e.g. biotech companies were grouped into “therapeutics and diagnostics” (so-called “red biotechnology”), “agriculture, food, environment”, “equipment and reagents”, and “biotechnological services”. In questions concerning the location of the companies, the data was evaluated separately for the state capital Munich, planning region 14 without the city and EMM without planning region 14.



©Spectral-Design-fotolia.com

### Definitions

**A**s in the previous study of 2005, **biotechnology companies** are defined as companies who develop and/ or produce products on the basis of modern methods of molecular biology. Since "classical" pharmaceutical companies are also increasingly applying such methods, it is often difficult to distinguish precisely between biotechnology and pharmaceuticals.

**Pharmaceutical companies** are companies who develop and market drugs or medicines. This corresponds to the NACE categories 73104\* (research & experimental development in the medical sciences), 24420\* (manufacture of pharmaceutical preparations), 241\* and 244\* (manufacture of pharmaceuticals, basic and medicinal chemicals and botanical products). In several cases companies were categorized as pharmaceutical companies as they had placed themselves under category 51461\* (wholesale of

pharmaceutical goods). The categorization follows the business area system published by the German Federal Statistical Office in 2003.

**Contract Research Organizations (CROs)** are companies who carry out and coordinate clinical trials for candidate drugs under contract to biotech or pharmaceutical companies. CROs that are not responsible for trials and instead, for example, advise clients regarding regulatory aspects or prepare registration dossiers, were included in this category on the basis of their specific focus.

**Pharmaceutical wholesale** is defined by NACE code 51461\* as "wholesale with pharmaceutical goods". Of NACE-category 5185\* (dealer of pharmaceutical goods, medical and orthopedic articles and lab equipment, medical supplies, dental instruments, hospital and elderly care supplies) only the pharmaceutical sector was considered.

**Other life science companies** from neighboring areas such as veterinary medicine, contract manufacturing (CMO), suppliers and certain sectors of medical technology or cosmetics were assigned to the respective NACE codes and categorized on the basis of what the polled companies said in the questionnaire their business segment was.

In this study the term **life science** comprises all above-named categories of enterprise, comprising all companies who deal mainly with the production or distribution of pharmaceutical or biotechnological products or develop preliminary stages or instruments for the production of these products.

Not included in the life sciences are all institutions of public health as well as retail trade with pharmaceutical products (pharmacies). Likewise the great majority of medical technology companies were not subject to this study, with the exception of those closely linked to biotechnology.

## List of abbreviations

BMBF	Bundesministerium für Bildung and Forschung Federal Ministry of Education and Research
CMO	contract manufacturing organization
CNS	central nervous system
CRO	contract research organization
DNA	desoxy ribonucleic acid
EMA	European Medicines Agency
EMM	Europäische Metropolregion München European Metropolitan Region Munich
IBP	industrial processes, biogenetic building blocks and performance
IHK	Industrie- and Handelskammer Chamber of Industry and Commerce
IZB	Innovations- and Gründerzentrum für Biotechnology Innovation and Founders Center for Biotechnology
LMU	Ludwig-Maximilians-Universität
MPI	Max Planck Institute
MRKO	Ministerkonferenz für Raumordnung Conference of Ministers for Spational Planning
NACE-Code	Nomenclature Générale des Activités Économiques dans les Communautés Européennes (EU classification system)
OTC	over the counter
R&D	research and development
SME	Small and mid-size enterprises
TUM	Technische Universität München
VC	venture capital

## Imprint

Chamber of Industry and Commerce for  
Munich and Upper Bavaria  
Department of Innovation, Research and  
Technology, Product Safety  
Monika Nörr  
Max-Joseph-Straße 2  
80333 Munich  
Phone: 089 5116-0  
E-mail: [ihkmail@muenchen.ihk.de](mailto:ihkmail@muenchen.ihk.de)  
[www.muenchen.ihk.de](http://www.muenchen.ihk.de)

City of Munich  
Department of Labor and Economic  
Development, Economic Development and  
Employment Strategies  
Claudia Hörter  
Herzog-Wilhelm-Straße 15  
80331 Munich  
Phone: 089 233-25459  
E-mail: [claudia.hoerter@muenchen.de](mailto:claudia.hoerter@muenchen.de)  
[www.muenchen.de/arbeitsundwirtschaft](http://www.muenchen.de/arbeitsundwirtschaft)

Bio<sup>M</sup> Biotech Cluster Development GmbH  
Dr. Petra Burgstaller, Dr. Georg Kääb  
Am Klopferspitz 19  
82152 Martinsried  
Phone: 089 899679-0  
E-mail: [info@bio-m.org](mailto:info@bio-m.org)  
[www.bio-m.org](http://www.bio-m.org)

Responsible: Monika Nörr, Claudia Hörter  
Translation: Anne Hodgson  
Design: Word Wide KG  
Printing: Weber Offset GmbH  
April 2009

