Invest
in Bavaria
The Business Promotion Agency of the State of Bavaria

Healthcare in Bavaria

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Bavarian Ministry of Economic Affairs,
Infrastructure, Transport and Technology

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Invest in Bavaria – The Business Promotion Agency of the State of Bavaria

The one-stop all-round service

Invest in Bavaria is the Business Promotion Agency of the State of Bavaria. Since 1999, it has been helping companies from Germany and abroad to build up or extend a base in Bavaria. Invest in Bavaria puts together customised information, helps to find the ideal location in Bavaria and arranges the contacts needed for implementing projects: with government agencies and associations as well as with important local networks. The services offered by Invest in Bavaria are free of charge and all inquiries are, of course, treated confidentially. The Business Promotion Agency of the State of Bavaria is a reliable and competent partner for every phase of the investment project.

Planning and Preparation

The better the information about potential sites, the easier it is to reach a sound and efficient investment decision. Invest in Bavaria provides companies interested in Bavaria with comparable and reliable facts and figures about the market and business environment, industry and technology networks or funding and financing instruments.

Choice of Location

Project-related location criteria are jointly developed to meet the wishes and needs of the investor. Invest in Bavaria uses this requirement profile to draw up concrete proposals of potential sites, to identify suitable commercial properties and industrial real estate and to organise on-the-spot site inspections.

Location Implementation

Once the location has been chosen, Invest in Bavaria makes sure that the companies receive local support from the right partners. It investigates funding options, organises contacts with appropriate funding institutions and – if required – with possible financing partners. Invest in Bavaria also offers its assistance with tax, legal and administration issues, ensuring straightforward and smooth coordination with the relevant authorities for a particular project, the regional business development organisations or specialised service providers.

Site Development

Even after the new business has been set up, Invest in Bavaria is still on hand for interested companies. Information on the promotion of business in Bavaria, like the trade fair participation program, all the way to tips about useful corporate databases and industry networks and arranging contacts with foreign communities are typical examples of the wide range of services offered by Invest in Bavaria. And if it is a matter of expanding an existing facility, Invest in Bavaria will be standing by ready to offer help, advice and good contacts.

Preface

Martin Zeil
Deputy Prime Minister of Bavaria
Bavarian Minister of Economic Affairs, Infrastructure, Transport and Technology

The life science sector develops key technologies of the 21st century like no other sector and is highly innovative. Added value and sustainable growth can only be achieved by means of innovations. Bavaria is well prepared for this challenge. With global industry leaders like Siemens, GE, Novartis, Roche, but especially due to the research-oriented and committed small and medium sized enterprises, the Free State of Bavaria is a healthcare site that is unique in Europe.

In order to create innovations, research facilities must be available. Bavaria offers the best conditions in this regard: with 13 Max Planck Institutes, three Helmholtz Centres and eight Fraunhofer Institutes, Bavaria enables a close networking of research and practical implementation. Eleven universities and 17 universities of applied sciences create a climate for a direct entrepreneurial implementation of the latest research results and produce highly qualified experts for Bavarian companies.

Also citizens benefit from this lively climate of innovation: the comprehensive availability of more than 400 hospitals and 300 prevention and rehabilitation facilities ensures the involvement of everybody on the medical progress.

The complex healthcare sector is closely linked in all segments and assumes an extraordinary role in the technology policy of the Free State of Bavaria. Especially through the targeted bundling of different partners from various sectors, Bavaria initiated an effective cluster policy in 2006. In particular, the high-tech companies on site benefit from this, as the connection and the interchange between science and economics is considerably simplified and accelerated. Specific frameworks have been used in order to establish uniform standards in the areas of standardisation and legislation. These contribute substantially to targeted research in order to continue being a global leader in this segment.

In order to provide investors with access to this extraordinary potential, representatives of the Free State of Bavaria are available as points of contact in metropolises of more than 20 countries. They cooperate closely with Invest in Bavaria, the Bavarian Business Promotion Agency. Invest in Bavaria supports investors comprehensively, confidentially and free of charge. From the initial conversation on the choice of location to the groundbreaking ceremony and the continuous follow-up care, the team of the Business Promotion Agency supports companies together with its country and sector experts.

This brochure presents the strong position of Bavaria in life sciences and makes clear why the free state is an ideal place for business development and innovation. It provides an overview of all the excellent companies from biotechnology, medical technology and pharmaceuticals that you as an investor can work with and tells the success stories behind the people and the products which are "Made in Bavaria"!

Martin Zeil
Deputy Prime Minister of Bavaria
Bavarian Minister of Economic Affairs, Infrastructure, Transport and Technology

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MedTech in Bavaria

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Bavaria – Location for Biotechnology and Medical Technology

Overview

Across the globe, Bavaria is mainly known for its tourist highlights: Neuschwanstein Castle, the most visited German attraction, as well as the panoramic view of the Bavarian Alps with the highest mountain in Germany, the Zugspitze. Furthermore, Bavaria signifies culinary delights and lifestyle, beer gardens, hearty food and good beer. The same is true of the Oktoberfest, the largest public festival in the world. The unique combination of the great scenic beauty, culture and culinary delights attract more than 25 million visitors each year; the highest number of visitors throughout Germany. But Bavaria is also a booming business location and high-tech region. Several global players, among them seven of the 30 corporations listed in the Dax, Germany's blue chip stock market index, have their headquarters in Bavaria. BMW, Audi, Siemens and Adidas are only a few examples for the variety of companies with international standing located in Bavaria. Bavaria is also an innovation hub. Both the diesel engine and the MP3 format as well as soccer shoes with screw studs were developed in Bavaria. Even in the field of life science the Free State of Bavaria is a national and international leader.

Investments in high tech pay off

EUR 800 million – this is the sum the free state of Bavaria has so far invested in the construction of the Biotech and MedTech hub Bavaria. Successfully. Today, Bavaria is one of the three top locations for biotechnology in Europe. In a national comparison, Bavaria is in the lead. The medical technology developed in Bavaria also leads on both a national and international level. 25,000 jobs depend on the industries of Biotech and biopharmaceuticals; in medical technology alone, 45,000 jobs in the Leading-Edge Cluster of the Medical Valley European Metropolitan Region Nuremberg. Besides a vast amount of small and medium sized enterprises (SME's), globally operating multinational healthcare groups decided on Bavaria as their location. Roche Diagnostics operates one of the worldwide largest biopharmaceutical research and production sites in Penzberg on more than 350,000m². Siemens Sector Healthcare, global market leader in the field of imaging diagnostics, has its headquarters in Erlangen.

Growth Segment: Bavarian Biotechnology

In the past 15 years, five biotechnology clusters have developed in Bavaria. In the biotechnology regions of Wuerzburg, Regensburg and Munich, the focus is on biotechnology with a healthcare aspect. The other two clusters, Freising-Weihenstephan and Straubing, are more specialised on green or white biotechnology. In order to support

Dedicated biotechnology and medical technology centres in Bavaria

Source: own research

Bio-Region	Startup centre	Rentable space	Tenants	Employees
Munich	IZB Martinsried/Freising	23,000 m²	> 60	700
Regensburg	BioPark Regensburg	18,000 m²	> 30	550
Franconia	IGZ Würzburg	5,000 m²	> 20	300
Nuremberg-Erlangen	Medical Valley Center	5,000 m²	> 30	200

Employees: Number of employees of the tenants in the respective startup centre

and make better use of the particularities and strengths of the different regions, individual network organisations have been formed that are responsible for the management of the respective clusters: the Bio^{M} Biotech Cluster Development GmbH manages the metropolitan region of Munich as well as the neighbouring cluster of Freising-Weihenstephan; the BioPark Regensburg GmbH manages the region of Regensburg and the IGZ Bio-Med/ZmK represents the region of Wuerzburg. Their objective is the development and marketing of the respective cluster in the interest of the founders, companies and scientists in each of the locations, as well as a networking of companies, universities, research facilities, university hospitals, chambers and associations, investors, funding authorities, advisers and other workers in the cluster. The Bio^{M} Biotech Cluster Development GmbH has been coordinating and networking all biotechnology activities within Bavaria across since 2006.

Metropolitan Region Munich – Pioneer in Biotechnology

Startup centres are a special component of each regional cluster. They provide the infrastructure that biotechnology startups need for the growth of their company, especially laboratories and office spaces. Various important players of the German biotechnology industry originate from the Innovation and Startup Centre (IZB) in Martinsried and Freising-Weihenstephan, founded

"The launch of the tech campus is expected for 2015"

Interview with Dr. Thomas Diefenthal, Managing Director, BioPark Regensburg GmbH

What characterises BioRegio Regensburg as part of the Biotech cluster of Bavaria?

In 1999, a centre for biotechnology was created on the Regensburg University campus under the motto "small but mighty". Due to the principle of "short routes", in the east of Bavaria it was possible to address company founders, the medium-sized industry and external companies willing to relocate. Both sides have been benefitting from the integration of this network into the Bavarian Biotech cluster. The Leading-Edge Cluster in Munich is being linked to innovative companies situated in the outer regions of the Free State; at the same time, these companies receive access to the extensive services and information provided by the regional initiatives.

There are many interdisciplinary projects in Regensburg. How did this come about?

Regensburg's consistent and innovative business promotion forms the basis for this. In addition, the decision-makers involved often know one another personally due to the geographical proximity. Ideas can then be implemented in projects quickly. Firstly, projects were created with life sciences companies, i.e. pharmaceutical, analytics, diagnostics and medical technology firms. Other areas followed, such as sensor systems. Since automation in all areas of a Biotech lab or in the processing industry, e.g. foodstuffs, has been booming, this sector is also expanding. Due to the comparably short development times, such companies are successful on the market even today.

What do you imagine the location of Regensburg will be like in ten years?

The neighbouring tech campus to be commissioned in 2015 will accommodate a multitude of companies, which started out in the BioPark Regensburg.

Dr. Thomas Diefenthal is Managing Director of BioPark Regensburg GmbH. He also coordinates the BioRegio Regensburg biotechnology cluster and is the deputy speaker of the German BioRegionen working group.

in 1995 and 2007, respectively: Morphosys and Micromet (now Amgen Research GmbH) as well as Corimmun were founded in this centre. The Munich site is characterised in particular by its proximity to first-class centres for fundamental research. The Bavarian capital is home to three biological-medical Max Planck Institutes for biochemistry, neurobiology and psychiatry, one Helmholtz Zentrum München (German Research Centre for Environment and Health), the Fraunhofer Headquarters, the Gene Center Munich that, since 1984, has played a pioneering role both scientifically and organisationally in the German research community, the two universities of applied sciences of Weihenstephan-Triesdorf and Munich as well as two of the best German universities, the Technische Universität München and Ludwig-Maximilians-Universität. Additionally, it is home to two university hospitals (Klinikum der Universität München and Klinikum rechts der Isar) and 60 other hospitals in Munich and its surroundings.

m⁴ – Leading-Edge Cluster of Personalised Medicine

In 2010, the German Ministry of Education and Research honoured the Munich consortium "m⁴ – Personalised Medicine and Targeted Therapies" in the second round of the Leading-Edge Cluster competition as one of the five Leading-Edge Clusters. The vision of this Leading-Edge Cluster is to establish itself as an international model area and area of excellence for personalised and targeted therapy. For this purpose, funds in the amount of approximately EUR 100 million are available for a period of five years; about half of these funds have been contributed by the companies involved. The BioM Biotech Cluster Development GmbH assumes the management.

Regensburg – Interdisciplinary Cooperation

The BioPark Regensburg GmbH is not only in charge of the cluster management but also operates a startup centre with the same name on the campus

"Our location is essentially characterised by its further education establishments"

Interview with Dirk Jung, COO, joint operating company IGZ BioMed/ZmK mbH

Dirk Jung is COO of IGZ Würzburg and Deputy Managing Director of Congress-Tourismus-Wirtschaft of the City of Wuerzburg.

Can you briefly introduce the Biomed region of Wuerzburg?

We are a location which is essentially characterised by its further education establishments. Many of our tenants come from the University of Wuerzburg or the Wuerzburg-Schweinfurt University of Applied Sciences. The change in the culture of promotion has resulted in spin-off companies today consisting of rather small groups of founders, who remain in further education for a comparably long amount of time. This thus reduces influence being exerted by venture capitalists at a very early stage. The University Hospital is also significant for our life sciences landscape. We hope to soon be able to house the first spin-off companies from the hospital.

Which sectors are represented within IGZ?

From the beginning, IGZ was topically split into two or three areas: on the one hand, there was biotechnology and biomedicine, on the other hand, there was information and communication technology, and also, at the interface, bioinformatics. We have now expanded the topics of IGZ to include closely-related scientific areas. In this way, we can also offer highly qualified niche suppliers ideal starting conditions in the medical technology service.

How intense is the collaboration with other cluster regions?

For us, 'founding companies from one's own means' and 'corporate maintenance' are key phrases. But for this, local and national networking is absolutely necessary; this actively illustrates exchange on the part of the individual bioregions, as well as cooperation at interdisciplinary level. At the moment, we are intensifying our efforts to establish contact between the spin-off founders, established firms and further education establishments. In this way, we hope to get solutions from science to the questions posed by business.

of the University of Regensburg. Located in the BioPark are mainly companies of the field of biotechnology and medical technology as well as related service providers. Furthermore, there are eight non-academic research institutes or project groups within the BioPark, among them two Fraunhofer Project Groups (Diagnosis and Treatment of Tumors, Metabolic Disease and Disease associated with Ageing and Sensor Technology Materials). This demonstrates the proximity to non-academic research units. In addition, a number of research networks have been formed in the region of Regensburg. The latest example is the Centre for Interventional Immunology that pools existing medical and scientific excellence in immunotherapy and transplantation medicine in eastern Bavaria.

Wuerzburg – Centre of Competence for Biomedicine

The Innovation and Startup Centre (IGZ) Würzburg is the largest startup centre in northern Bavaria and is home to companies in life sciences and IT. It is located in direct vicinity to the University of Wuerzburg and the University of Applied Science as well as numerous research facilities. For companies in biotechnology and medical technology, the proximity to the renowned department for biomedicine of the university as well as the university hospital is of particular importance. Not least for this reason, Wuerzburg is recognised as a centre of competence for biomedicine.

Strong Starting Situation for Bavaria's Biotech-SME's

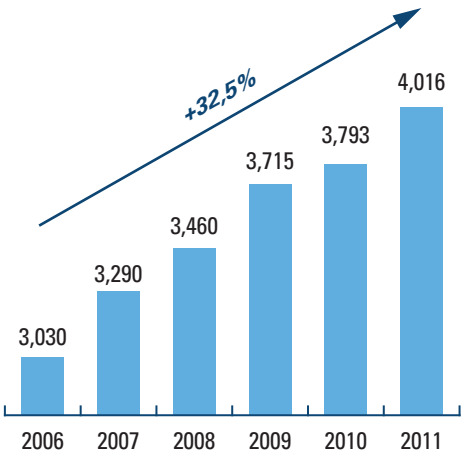
The importance of Bavaria for biotechnology becomes very clear in a national comparison. More than half of the more than 320 companies located in Bavaria in biotechnology and pharmaceuticals are small and medium sized enterprises (SMEs). This represents around 30 per cent of German SMEs in biotechnology. The specific focus of these companies is the development of new therapeutics and diagnostics. Their "drug candidates" are tested worldwide in over 80 clinical trials. More than 100 candidates in research and preclinical studies ensure a steady supply.

Medical Valley – Leading-Edge Cluster for Medical Technology

When talking about German medical technology, the Medical Valley European Metropolitan Region of Nuremberg (EMN) cannot be ignored. The Medical Valley EMN is the leading region for medical technology within Germany. Like the m^4 in Munich, it was honoured in 2010 by the German Ministry of Education and Research as national Leading-Edge Cluster. It is characterised by a high concentration of excellence in medical technology. Approximately 500 companies operate in the Medical Valley, among them numerous global players and many market leaders. The Medical Valley Center is the foundational core of the cluster. In its direct vicinity are more than 70 institutes with medical engineering orientation in Friedrich-Alexander Universität Erlangen-Nürnberg and universities for applied sciences, more than 20 non-academic research facilities closely linked to medical technology (among them Fraunhofer and Max Planck Institutes) as well as more than 65 hospitals. The unusual density of partners together with the international market and competitive position of individual companies provide ideal conditions for

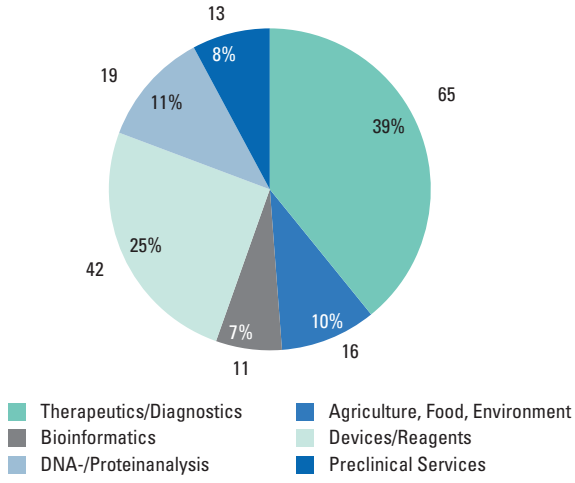
Bavarian Biotech SMEs' staff since 2006

Source: Bavarian Biotech Report 2011/12, Bio^M Biotech Cluster Development GmbH



Bavarian Biotech SMEs by field of expertise

Source: Bavarian Biotech Report 2011/12, Bio^M Biotech Cluster Development GmbH



"Bavaria is a leading medical technology region"

Interview with Prof. Dr. Michael Nerlich, Chairman, Forum MedTech Pharma e.V.

What role does the Forum MedTech Pharma network play for the healthcare sector in Bavaria?
As the biggest network of its kind in Europe, Forum MedTech Pharma is a platform for trans-regional and international networking. Regional networks and clusters such as Medical Valley EMN or the Biotech cluster in Munich give rise to close connections. Their regionally focused commitment is perfectly complemented by the trans-regional network activities. As a national and international link, the association ensures the extensive consideration of all phases of the value added chain – from research and development, over production, supplier networks, clinical trials and application, to international marketing. In addition, interfaces between the disciplines of medicine technology, biotechnology and pharmaceuticals are being created.

How significant is Bavaria for medical technology in Germany?
30 per cent of all medical technology products and even 60 per cent of all electromedical devices in Germany are created in Bavaria. Bavaria is number one when considering the total turnover generated in the field of medical technology, and it comes second as regards the number of employees. Bavaria can thus be called a leading medical technology region, and rightly so.

What trends can be observed in medical technology?
In the area of technology, the far-reaching collection of information technology, the trend towards devices for out-patient or even domestic care, or even the ever-growing interplay of the medicine technology, biotechnology and pharmaceuticals sectors, in the form of combination products, for instance, are important current developments. The sector is devoting its energies to even greater technological challenges resulting from the requirement of ensuring efficiency in the case of innovations and dealing with the issue of cost reimbursement for products and services.

Prof. Dr. Michael Nerlich is head of the Department for Accident Surgery at Regensburg University Hospital. He is also Chairman of Forum MedTech Pharma e.V.

the transfer of ideas into products and services. The Medical Valley is being developed, coordinated and marketed by an association with the same name. The recipe for success of the cluster is the close contact between highly specialised research institutes, internationally established market leaders as well as growing and medium Furthermore, the largest German network of the German health sector (more than 620 members from 14 countries), Forum MedTech Pharma, is located in the Medical Valley EMN. The association offers the players of the sector various opportunities for national and international networking.

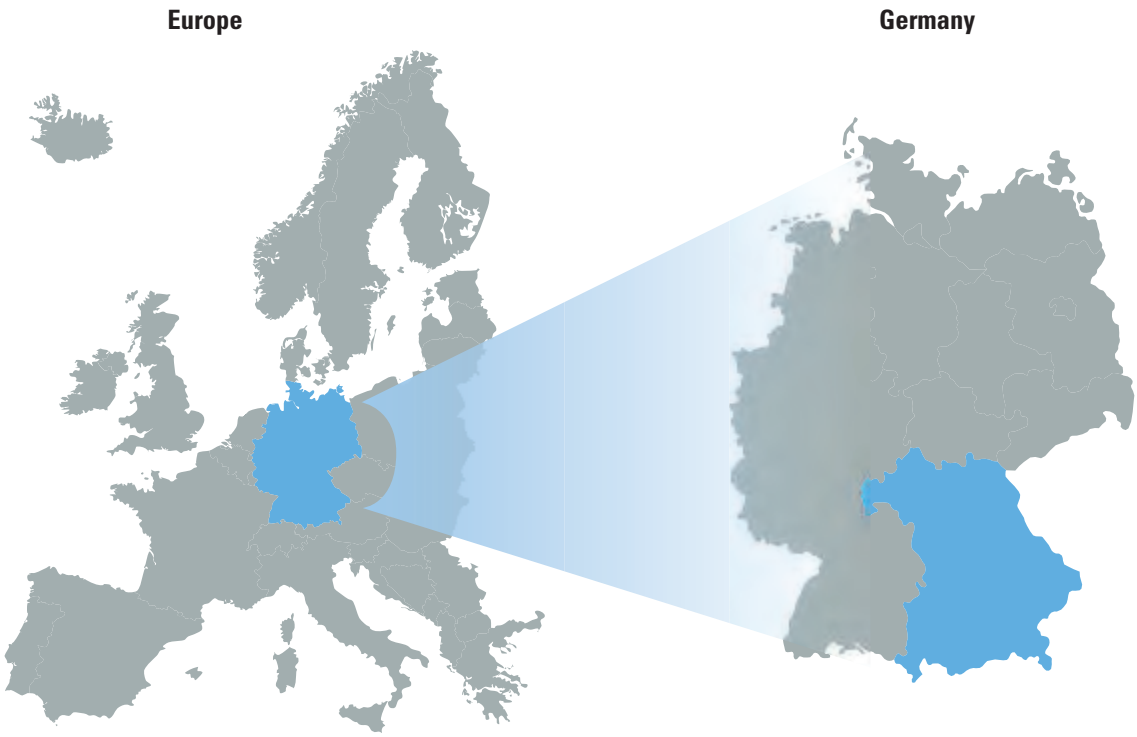
Strong SMEs in the Field of Medical Technology
The actual strength of Bavarian medical technology becomes clear on a closer inspection of its turnover. EUR 7 billion, almost one third of the total turnover of EUR 22 billion in German medical technology, are produced in Bavaria. This puts Bavaria in front of countries like France or Italy. In particular, SMEs play a specific role in the medical technology of Bavaria. The majority of companies located here are SMEs. Companies with less than 50 employees even make up more than half of all medical engineering companies.

Conclusion
The future prospects for the healthcare site Bavaria are consistently positive. Strong fundamental research, ideal infrastructure, a high degree of networking and interest in active cooperation are responsible for the positive impulses that originate from Bavaria. Biotechnology and medical technology are important pillars of the Bavarian and German economies and should remain this way in the future. The German and Bavarian governments demonstrate this with their continuous investments in these sectors.

Martin Bellof

Bavarian Bio-Regions engaged in healthcare

Source: own presentation



"Synergies between drug development and medical technology are especially valuable"

Interview with Prof. Dr. Horst Domdey, Bio^M, and Prof. Dr.-Ing. Erich R. Reinhardt, Medical Valley EMN e.V.

Prof. Dr. Horst Domdey is Managing Director of Bio^M Biotech Cluster Development GmbH and speaker of the Bavarian Biotechnology Cluster.

Prof. Dr.-Ing. Erich R. Reinhardt is Chairman of the Medical Valley EMN.

Professor Domdey, what significance does the Munich Biotech Cluster have in Germany and how does it differ from other locations?
Domdey: In the area of drug development, the Munich Biotech Cluster m^4 is, without a doubt, the most successful biotechnology location in Germany. We are proud that patients are already benefiting from four drugs that were developed here. With more than 300 life science companies and a good 130 small and medium-sized companies, we are also counted among the European market leaders. What characterises Munich and what promotes both innovation and translation is the close dovetailing of excellent science and the Biotech industry.

Professor Reinhardt, what is the USP of Medical Valley EMN compared with other medical technology clusters in Germany?
Reinhardt: Global players such as Siemens and many SMEs are developing innovative medical technology in Medical Valley EMN. Even in the early stages of the innovation process, they work closely with partners in science and healthcare. This is how a sustainable problem solving capability has arisen, that, together with the technological capabilities of partners, marks the innovative strength of Medical Valley.

What is your vision for the Munich Biotech Cluster in 10 years?
Domdey: Munich has devoted its energies to drug development, especially to the future trend of "personalised medicine", and is purposefully improving the corresponding framework conditions, such as the biobanking infrastructure. In addition to the well-filled drug pipeline, Munich offers unique technology platforms. Especially because of large international partners of companies such as Morphosys, Wilex, 4SC, Pieris or Proteros, the perception abroad is very positive and will improve further still.

Where do you see Medical Valley in 10 years?
Reinhardt: By 2022 many innovations from Medical Valley EMN will have revealed, that they are able to provide a sustainable contribution to healthcare efficiency and effectiveness. Initial assessments by some Leading-Edge Cluster projects show that, in Germany alone, EUR 7.5 billion could be saved per year – without loss of quality. Through innovations in structure and processes, Medical Valley EMN will develop into a model region for optimal healthcare with the highest credentials.

In the m^4 – personalised Medicine programme, you are planning to work more closely together with Medical Valley. What benefits do you see in doing this?
Domdey: I am convinced that through the interplay of precise diagnostics and targeted therapiest, a better and more cost-effective provision of healthcare services can be achieved. Synergies between drug development and medical technology are especially valuable in order to transfer innovative concepts into clinical practices.

How realistic is it that both regions are advancing together to become the leading European cluster in personalised medicine within Europe?
Reinhardt: Personalised medicine is a focal point for research and development worldwide, as knowledge about the effects of medication enables accurate and individual treatment. Strong cooperation between the medical technology and pharmaceutical sectors is therefore indispensible for the development of necessary technology. If the two strongest places in Bavaria in this sector pooled their abilities, the best conditions in which to form a Europe-wide leading working group in the area of personalised medicine would exist.

Interview conducted by Markus Hofelich.

Bavarian research excellence in Bio - technology and medical technology

Pioneering concepts are developing in the Free State thanks to academic and economic cooperation

Numerous institutes in Bavarian universities and other establishments are devoting their energies to medical technology and biotechnology. The outstanding position of Bavarian universities has been underpinned as part of the excellence initiatives, while the Centre for Higher Education Development (CHE) is listing several Bavarian faculties in the leading group of its research ranking. A multitude of support is now being offered for clinical studies, in order to overcome the hurdles. Activities for "personalised medicine", i.e. several academic cooperations, are considered to be especially pioneering.

Two locations of the Bavarian Biotech and MedTech research community that are rich in variety: Technische Universität München (top) and University of Augsburg
Photos: © Helmholtz-Zentrum München/TUM, Universität Augsburg

Interdisciplinary approaches are shaping the scene

Performing precise operations with robot systems is no longer a dream of the future. Indeed, lightweight robot arms, which a doctor can control remotely, have been developed at the Institute of Robotics and Mechatronics of the German Aerospace Center (DLR) in Oberpfaffenhofen. Another DLR Institute, the Institute of Atmospheric Physics, is devoting itself to the prevention of skin cancer through use of satellites. Interdisciplinary approaches such as these have long since characterised research in medical technology and biotechnology, too. The "Munich Center of Health Sciences" (MC-Health) of Ludwig-Maximilians-Universität (LMU) also pursues an interdisciplinary approach like the Munich Helmholtz Centre, Europe's leading research centre for "Environmental Health". Munich is internationally recognised as being the location for biomedical basic research and its clinical application. Ludwig-Maximilians-Universität and Technische Universität München (TUM) play a key role. At the latter's central Institute of Medical Engineering (IMETUM), the disciplines are entwined; specialities range from the "Medical Electronics Innovation Centre" to the "Heinz Nixdorf Professorship for Medical Electronics". The Max Planck Society accommodates one of its biggest biological-medical research concentrations in Munich with the Institutes of Biochemistry, Neurobiology and Psychiatry. An example of the close networking is the Excellence Cluster Center for Integrated Protein Science Munich (CIPSM). At the Julius Maximilian University of Wuerzburg, the Interdisciplinary Center for Clinical Research (IZKF) is the internal research promotion tool. The Friedrich-Alexander-Universität Erlangen-Nürnberg is home to a Centre for Medical Physics and Technology; while at the University of Regensburg,

a Telemedicine Centre has been built. The Fraunhofer Society is dealing with issues relating to medical technology at several locations, such as in Erlangen (image processing), Fuerth (X-ray technology) and Regensburg (tumourous and metabolic diseases). There are also technology projects at the Bundeswehr University Munich, from sensor systems for prosthetic arms to computer simulation for injecting bone cement. At the University of Passau, the Faculty of Computer Science and Mathematics is dealing with digital image processing for computer tomographs, while the University of Augsburg has made a name for itself with a legal research establishment for medical device law. Further education certificates can be acquired for this purpose at the university's Centre for Further Education and Knowledge Transfer (ZWW) – a phenomenon which is unique in Germany.

Clinical studies at a number of locations

Innovation hurdles in medical technology are not something that the experts have had to deal with since VDI/VDE Innovation und Technik GmbH tackled this thorny issue with a study. Consultancy and support in the case of clinical studies are now gaining in significance. For studies such as these, there are several starting points – primarily, but not limited to, the university hospitals in Munich, Erlangen, Regensburg and Wuerzburg, or the German Heart Centre in Munich. The coordination serves as a "Bavarian Network for Clinical Studies" (BayernNetz) with a branch office at the university hospital Klinikum rechts der Isar (on the right of the river Isar) in Munich. Clinical studies are thus to be made easier for even smaller companies. Centres for clinical studies are also being run at several universities. The LMU is involved in an ongoing basis in clinical and epidemiological studies, both in individual hospitals and in establishments such as the "Clinical Study Center" (CSCLMU), the "Coordination Centre for Surgical Studies" (KCS) or the Comprehensive Cancer Center (CCCLMU). Clinical studies are also possible at the Munich Tumour Centre (TZM). The translation of results from basic research and pre-clinical studies to clinical practice is also being ascribed a great deal of importance at the Faculty for Medicine at TU München, for instance at the Klinikum rechts der Isar. The Helmholtz Zentrum München also nurtures collaboration with industrial partners. Clinical studies can also be conducted at other Bavarian establishments, such as the Asklepios Fachkliniken München-Gauting – primarily in thoracic oncology and in interventional broncholo-gy – or at the Munich Municipal Hospital Group. What needs to be observed during clinical studies is often underestimated by developers. "In the first instance, they are shocked", confirms Dr. Bernd Gebhardt, Manager of the Center for Clinical Studies (CCS) at the Friedrich-Alexander-Universität Erlangen-Nürnberg. But he helps the hospitals with the complex organisational, business-related and legal tasks. Support such as this is now attracting circles.

Within around 40 research projects interdisciplinary academic research and industrial partners are being brought together.
Photos: © BVMed-Bilderpool, Fraunhofer IBMT

Strategy concept for personalised medicine

Key research principles are being developed in Bavaria for the field of "personalised medicine", which may well usher in a profound change to medicine and a new dimension of drug development by way of an individual focus. This applies, for instance, to the work undertaken on depression by Professor Florian Holsboer, who works at the Max Planck Institute of Psychiatry in Munich, to the work examining the development of Herceptin (the only personalised cancer drug for many years) undertaken by Professor Axel Ullrich, who is now Director of the Max Planck Institute of Biochemistry, or that of Professor Matthias Mann at the Max Planck Institute of Biochemistry in Martinsried near Munich, which looks into innovative technologies for proteins. In the Munich Metropolitan Area, biotechnology and pharmaceutical companies, hospitals and scientific institutes have come together with the cluster management company Bio^{M} for a strategy concept entitled "m^{4} – Personalised Medicine and Targeted Therapies". Within around 40 research projects, the work of interdisciplinary academic research and industrial, mainly medium-sized partners, is being brought together. The responsible company, Bio^{M} Biotech Cluster Development GmbH, is working closely with partners at universities and other research establishments, as well as service providers.

Dr. Lorenz Goslich

The highlight from Erlangen

Testing directly in the hospital

Small and medium-sized companies are often faced with a mountain of problems when it comes to testing new medical technology solutions and devices. What has to be observed? What is to be documented? How do you obtain approval? In Erlangen, there is help to overcome the mountain: with "Metean".

All-inclusive – from the idea to marketing
The "Metean" Medical Technology Test and Demonstration Centre of the Fraunhofer Institute for Integrated Circuits (IIS) in Erlangen is a key project within the Fraunhofer "Personal Health" cluster of innovation, which bundles different competencies within the Fraunhofer Society. Its vision is to prevent illnesses through providing medical remote support. Healthcare research projects form the most important focal point of Metean's work. Clinical studies are conducted in cooperation with hospitals, university institutes, health insurance firms and companies. At the fore are improvements through use of telemedicine systems and services – both in the case of the transition from in-patient to out-patient treatment and support, and in the case of healthcare quality. The experts at Metean are aspiring to cover the entire chain of the innovation and development process, from the idea over feasibility analyses, tests and validations, to certification and approval – and not least rapid marketing.

Campus of Friedrich-Alexander-Universität Erlangen-Nürnberg
Photo: © Friedrich-Alexander-Universität Erlangen-Nürnberg

Fast user feedback is catered for
The highlight at Metean is close involvement in Universitätsklinikum Erlangen (Erlangen university hospital), the infrastructure of which can thus be used for external partners. The Test and Demonstration Centre is situated directly on the premises of the university hospital. Together with the medical staff, the new innovations are subjected to testing within everyday hospital life – and if the worst comes to the worst, problems are discovered immediately. The findings are then passed on to the relevant company without delay. Fast user feedback is thus catered for, such that no unnecessary time is wasted and relevant ramifications can be drawn. The staff at Metean believe that they can help small and medium-sized companies especially to overcome innovation hurdles and to find a way through the statutory, regulatory, economic and technical regulations with their multitude of basic conditions.

Highly personal: the tracksuit that instructs its user
In the Fraunhofer Institute for Integrated Circuits, the Image Processing and Medical Technology (BMT) department is primarily devoting its energies to medical image processing, medical sensor systems, medical communication and biosignal processing. Indeed, the "Hemacam" product, a computer-assisted microscope system for haematology, was developed at Metean. One example of the intensive work being undertaken on the topic of personalised medicine is a so-called fitness companion, a sub-project of the "FitForAge" Bayerischer Forschungsstiftungs - verbund (Bavarian Research Foundation Association). It is an intelligent tracksuit, which provides an individual health and fitness program, evaluates the data measured, provides the user with feedback on his activities and thus instructs him in gymnastic or rehabilitation exercises – in an entirely personal manner, as it were. To date, this suit has primarily been used in movement programmes for the elderly or rehabilitation patients. But in the future, it is also to be offered to young people, for games or virtual competitions, for instance.

Dr. Lorenz Goslich

Pharmaceutical and medical technology companies in Bavaria

Overview, trends and developments

Representatives of both the pharmaceutical and the medical technology industry are companies with an above-average level of commitment to research and development. With research expenditure amounting to more than 10 per cent of company turnover, they are both innovation drivers and business drivers in equal measure. In addition to numerous small and medium-sized companies, global players such as Siemens Healthcare, Roche Diagnostics, GE Healthcare, Novartis Pharma, Fresenius Medical Care or GlaxoSmithKline are also represented in Bavaria with research and production sites.

An attractive location for global players

In the field of drug development, Germany shook off its role as "the world's pharmacy" many years ago. Numerous so-called pharmaceutical giants have relocated both their research and development sites and their production facilities abroad. But it is a different situation in the area of promising drugs produced using biotechnology. Here, Germany has established itself as the biggest production site in Europe and, on a global scale, is the world number 2, following the US. Companies such as Roche Diagnostics are responsible for this development. Through making continuous investments in its Bavarian site in Penzberg, Roche Diagnostics has expanded to become the Roche Group's biggest biotechnology research, development and production centre within Europe, with more than 4,500 employees. As a pioneer to a certain extent, Roche has committed itself to personalised medicine as a core element of its business strategy. Generally speaking, the concept of personalised medicine requires the patient to be characterised on the basis of so-called biomarkers, which allow for said patient to be assigned to a patient group for which tailored treatment is available. With regard to the co-development of diagnostics and treatment required for this, in Bavaria Roche is benefiting from the group's globally unique location, where research, development and production of the two business divisions, Pharmaceuticals and Diagnostics, are combined.

Fantastic research infrastructure and excellently trained staff

A key tool during the development of new active agents and drugs is testing them on individuals as part of clinical studies. Here, Bavarian companies are benefiting from the fantastic research infrastructure and excellently trained staff in a well-developed network of in-patient and out-patient medical care establishments. Over the last few years, there has been a further considerable increase especially in the number of approval studies performed in Germany during the early phases I and II. Global players such as Novartis Pharma with just under 1,800 employees at the Nuremberg site have strengthened Germany, where it is currently conducting around 180 ongoing studies, to make it the most important clinical research location after the US. The situation is a similar one for the German subsidiaries of the international pharmaceutical giants such as GlaxoSmithKline, MSD and Daiichi-Sankyo, which also have their headquarters in the Munich Metropolitan Area. Beyond pure sales subsidiaries, firms have increasingly been investing in the expansion of their clinical research sites over the last few years.

Medical technology from Bavaria: Leading position for electromedical devices

In the field of medical technology, Bavaria covers around 30 per cent of Germany's entire medical technology production. Electromedical device production occupies a leading position, with a share of more than 60 per cent. In addition to a multitude of small and medium-sized companies, Siemens Healthcare (which has research, development and production sites in the Nuremberg Metropolitan Area), one of the world's biggest suppliers in healthcare, is responsible for this. With more than 50,000 employees the world over, the company is a specialist in the different areas of imaging and is the global market leader in the magnetic resonance tomography (MRT) sector. In addition to computer tomography (CT), MRT has established itself as one of the most important imaging procedures

Bavaria as a pharmaceutical and medical technology location is occupying an excellent position in the global environment
Photos: © Archiv, Ioana Drutu

and especially allows for the representation of soft tissue, such as that of the brain or internal organs. At present, MRT is increasingly gaining in significance in hybrid imaging, as a combination made up of MRT and positron emission tomography (PET). Due to the simultaneous measurement of morphology and function on the one hand and metabolism on the other hand, considerable advancements are possible in the case of clinical diagnostics, as well as in the development of new biomarkers in personalised medicine. Here, too, extreme technical efforts are required in order to render PET detectors usable within strong magnetic fields. In addition to the continual further development of its diagnostic systems and devices, Siemens Healthcare is pursuing a long-term strategy for the future by merging patient data from imaging and laboratory diagnostic procedures using its own in-house IT systems. The company is hoping to achieve an improvement in patient management in the case of early detection, diagnosis and treatment and thus an associated reduction in healthcare costs.

Efficiency and integration: The future of healthcare

Achieving integration in healthcare is also the strategy of Fresenius, the world's leading supplier of products and services for individuals with chronic kidney failure. More than every second dialysis machine in the world has been developed and produced at Fresenius' Bavarian site in Schweinfurt. On the basis of this business field, over the last few years Fresenius has developed other divisions and is nowadays not just combining the development and production of medicine products and drugs, but also patient care with some hospitals and special clinics in an integrated healthcare group. On the way to allowing for the best possible healthcare within a restricted budget, the increasing integration of different areas from medical technology and pharmaceuticals, diagnostics and treatment, is proving itself as a common strategy of large groups especially. The cooperation with different solution providers from the area of modern communication technology is also playing an important role in this development.

Summary

Bavaria as a pharmaceutical and medical technology location is occupying an excellent position in the global environment and has extensive potential to consolidate and further build on this international leading position. Accordingly, a large majority of companies are rating the prospects for the future as positive – based on the opportunities gleaned through new markets, demographic development, a high level of innovation and the outstanding reputation of "Made in Bavaria" healthcare products.

Ilja Hagen

"Willingness to found companies is spreading like a virus"

Interview with Prof. Dr. Axel Ullrich, Director, Department of Molecular Biology, Max Planck Institute of Biochemistry (MPIB)

Prof. Dr. Axel Ullrich is director of the Department of Molecular Biology at MPIB and a pioneering Biotech-entrepreneur.

Professor Ullrich, can you briefly introduce the MPIB and the focal points of its research?
We are part of one of the most successful research organisations in Germany, the Max Planck Society. Within our institute, eight departments and more than 30 research groups contribute to the latest findings in the areas of biochemistry, cell biology, structural biology, biophysics and molecular science. The classic research areas of our institute are developing increasingly in the direction of structural and system biology, genetics and new imaging methods – bioinformatics is playing a major role, too. Basic biomedical research is another important aspect, as faults in cellular signal transmission or defective protein structures can result in illnesses such as cancer, diabetes or Alzheimer's. The work of our scientists thus also helps to better understand the development of these illnesses and forms a basis for new therapy strategies.

Located in Munich/Martinsried – Max Planck Institutes of Biochemistry and Neurobiology.
Photos: © Max Planck Institute of Biochemistry

What significance does the MPIB have for the German biotechnology sector?
I think an important one. Some MPIB employees played a central role in the development of the sector. In the Seventies, Prof. Peter Hofschneider, for instance, was one of the first founders in the area of biotechnology at European level. Prof. Horst Domdey, who was greatly involved in expanding the biotechnology location of Bavaria and who today manages Bio[M] Biotech Cluster Development GmbH, had a laboratory at the MPIB and played a decisive role in establishing molecular-biological methods. And, I suppose, my past experiences in the first Biotech company in the world, Genentech, also helped. I think that a certain role model function was assigned to me, which inspired others. What's more, the Max Planck Society has also provided the premises on which the Martinsried Biotechnology Innovation and Startup Center is located.

You founded three companies within Martinsried, including Kinaxo GmbH, which was recently sold to Evotec. How would you evaluate the founding environment in Bavaria?
For some time now, I have had the feeling that among scientists, the willingness to found companies is spreading like a virus. It is unbelievably exciting to watch. Prof. Domdey, who acts as a promoter and advocate for the Munich and Bavaria region, is largely responsible for this. The environment for founding companies is very good. Academic and non-academic research establishments, founder centres and university hospitals are situated in direct proximity to one another and are in regular contact. I myself recently co-founded a company again and I am also considering another commitment.

You often travel abroad due to your professional activities. What strengths do you consider Bavaria as a location to have in an international comparison?
One of the biggest strengths of Bavaria as a business location is the political support. When players from politics recognise economic potential, they work consistently on tapping into this potential, too. I personally was therefore not surprised that the German biotechnology adventure started in Bavaria.

The interview was conducted by Martin Bellof.

Fit for the Medicine of the Future

Focus on "Personalised Medicine" in Munich

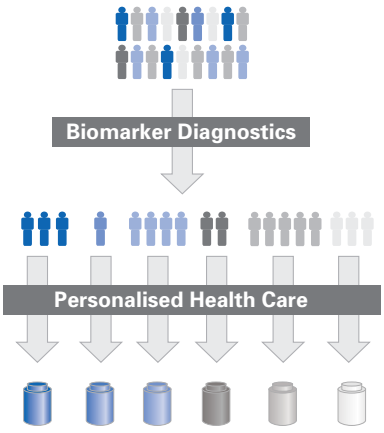
Despite enormous medical progress, the effectiveness of many medications is hugely limited. Even for the most common medical drugs, such as those against hypertension, the desired effect fails to appear for more than one third of the patients. The reasons for this are the different biological causes of illnesses and the diversity of the medically relevant dispositions as well as the life circumstances of each individual. These diverse individual factors define whether a medicine takes effect, shows no effect at all or even shows undesirable side effects.

Munich Leading-Edge Cluster m⁴

The Munich Leading-Edge Cluster m⁴ has set itself the task to develop effective and safe medications for serious illnesses such as cancer, cardiovascular diseases or autoimmune diseases on the basis of personalised medicine. Personalised medicine pursues the strategy that a more detailed molecular diagnostic prior to the drug administration can lead to a better assessment of which substance is suited best for which patient. With an accompanying diagnostic product that tests so called biomarkers, the patients are categorised in specific subgroups of diseases ("stratified"). Afterwards, each group is treated with a specific therapy if available: currently, only 26 "personalised" therapy options are approved in Germany, the main share of them in the field of oncology. "However, the international pharmaceutical sector shows a clear trend towards personalisation", says Prof. Domdey, the speaker of the Leading-Edge Cluster m⁴. Only with clearly defined patient groups is it possible to overcome the high efficiency and safety hurdles given by the regulatory authorities.

Personalised Health Care - how it works

Source: m⁴ – Personalized Medicine in Munich, Bio^M Biotech Cluster Development GmbH



Source of Inspiration for the Entire Region

More than 100 biotechnology companies and academic groups work in Munich's m⁴ consortium on 40 research and development projects sponsored by the federal ministry BMBF. "The projects turned out to be a source of inspiration for the entire region and have strengthened Munich's profile as a top site for innovative drug development", announces Prof. Domdey with pride. "Furthermore, several comprehensive infrastructure projects improve the framework conditions."

m⁴ Biobank Alliance

In order to discover new biomarkers and statistically prove their medical relevance, human biospecimens are required, especially tissue from sources such as tumour biopsies that are linked to the clinical data of the anonymous donor. In the m⁴ Biobank Alliance, the Technische Universität, the Ludwig-Maximilians-Universität and the Helmholtz Zentrum joined forces for a more efficient use of their biobanking resources. Scientists as well as the researching pharmaceutical and biotechnology industry benefit from the joint quality standards and a central access.

m⁴ Trial Service Center

Biomarkers offer new challenges, but also new chances for the implementation of clinical trials: on the one hand, the study becomes more complex; on the other hand, biomarkers can help stratify patients and allow statements on which patient groups would specifically benefit from therapy. The design of such biomarker-driven clinical trials is the focus of the m⁴ Trial Service Center. Here, companies receive advice and expertise on the topic of biomarkers – from the design of the study to the approval. These and other projects, such as those for training and technology transfer, help to make the Munich location fit for the medicine of the future.

Dr. Georg Kääb and Dr. Almut Graebsch

Land of the Biotech Pioneers

Innovation in Bavaria comes from small and medium sized enterprises

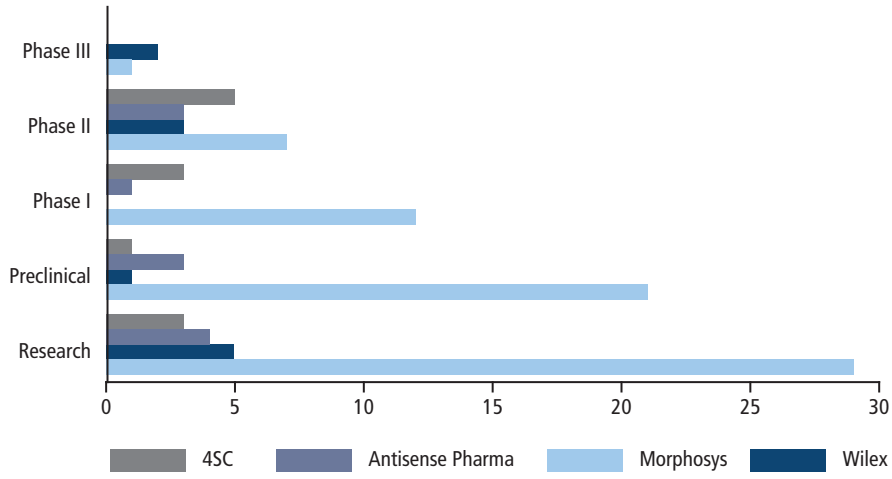
Thanks to a multitude of small and medium-sized companies within an environment characterised by entrepreneurial spirit, Bavaria has turned into an exciting location for the biotechnology sector in Germany.

Excellent Culture of Innovation

In Bavaria, a great deal of importance is attached to creativity. For more than two decades now, young innovative companies – often created as spin-offs of scientific institutions – primarily in the area of red biotechnology have been pushing a development which becomes manifest in impressive figures. The companies – 166 in total – today account for more than 30 per cent of all small and medium-sized businesses in Germany, and time and again, they attract the attention of investors. Bavaria thus received almost half of Germany's national venture capital provided for biotechnology in 2011. In the same year, the federal state was the only region in which international companies within the sector had set up shop. And there are good reasons for this development. One of them is the excellent scientific infrastructure with its renowned research institutes and further education establishments. Indeed, the universities in Munich, Regensburg and Wuerzburg are affiliated to both the Max Planck Institutes and the Helmholtz Zentrum München. Intensive exchange between science and companies, which are promoted by the Bavarian Ministry of Economics and to which – not least – the subsidiaries of renowned pharmaceutical companies also make a considerable contribution, is being pushed forward by regional clusters and national networks. Bavaria has not only turned the resultant culture of innovation into a hub, but also to a biotechnology driver in Germany. The more than 80 potential treatment candidates at an advanced clinical trial stage and a wealth of pre-clinical studies are testament to this. But the many small and medium-sized companies are increasingly capable of earning money, too. During the time from 2008 to 2011, they increased their turnovers by 30 per cent to more than EUR 510 million, while at the same time the number of

Product pipelines of 4SC, Antisense Pharma, Morphosys and Wilex

Source: own research



individuals employed within the sector grew from around 3,400 to more than 4,000 members of staff. Income from partnerships and licence agreements with large pharmaceutical and Biotech companies also contribute to the generation of turnover, as do revenues from the provision of know-how and services based on independently developed technology platforms.

Commercially Successful, Too

One of the flagships of the location is the antibody specialist Morphosys AG, which was founded two decades ago and has its headquarters in Munich. In 1999, it was the first German Biotech IPO to successfully make the jump to the stock exchange and it has leading technologies, which are used for research purposes, in diagnostics and in the manufacture of drugs. Through alliances with the world's most significant pharmaceutical companies, Morphosys has built up an extensive pipeline of more than 70 potential drug candidates – for treating cancer, rheumatoid arthritis and Alzheimer's to name but a few examples. The partnerships and the marketing of in-house technologies nowadays allow companies to completely self-fund their own research activities and to generate stable operating profits. A key foundation for this development is the Human Combinational Antibody Library (HuCAL), which has been built up over the years. As one of the many highlights in the company's history, in spring 2012 Morphosys recorded the first ever further development of a HuCAL antibody for the treatment of Alzheimer's patients in an approval-relevant study.

"IZB will continue to grow"

Interview with Dr. Peter Hanns Zobel, Managing Director, IZB GmbH

Dr. Zobel, can you briefly introduce IZB?

IZB was founded back in 1995. Its objective is to provide founders of biotechnology start-ups with the required building infrastructure. To this end, we offer laboratories and offices with flexible tenancy agreements. IZB has experienced strong growth since it was founded. On a total surface area of more than 23,000 m² at the Martinsried and Freising-Weihenstephan sites, we presently accommodate just under 60 companies. Beyond the infrastructure, we also arrange contacts within our far-reaching network of scientists, companies and investors and devote our energies to our tenants at trade fairs and events.

When do your tenants leave IZB?

Generally, we plan with a period of around five to seven years. By then, the companies have for the most part reached a size which would go beyond the scope of IZB's walls. But because laboratory space is thin on the ground on the commercial property market, in individual cases we also accommodate companies beyond this time.

What success stories can trace their roots back to IZB?

Since IZB was founded, around 50 companies have left. Most of them are successful even today. Nowadays, two companies that originated in Martinsried stand out especially. Firstly, there is Micromet, which was taken over by Amgen for USD 1.2 billion, and secondly, there is Corimmun, for which Johnson & Johnson, an American pharmaceutical firm, paid USD 100 million. When corresponding milestones are reached, this sum can even more than double.

What do you imagine IZB will be like in ten years?

By 2022, our campus will have continued to grow and will have turned into the best biotech location in Europe. The connection the underground railway, which will be completed by then, and a boarding house will further improve the infrastructure of our campus. The "faculty club" in our boarding house will allow for more intensive exchange in the campus network and make it even more prolific. I also firmly believe that by then the first Biotech blockbuster from Martinsried will have come into being.

Dr. Peter Hanns Zobel is the Managing Director of the Biotechnology Innovation and Startup Center (IZB) with sites in Martinsried and Freising.

Growth-Oriented Strategies
In addition, many of the other initial founders have expanded their business models over the years and developed promising growth strategies. For instance, Wilex AG, which is researching different types of cancer in the area of detection and targeted treatment and was created from a clinical group of researchers at TU München, nowadays generates turnover amounting to the millions and still on the increase. One of most advanced products of the product portfolios is an imaging diagnostics tool named Redactane. This tool serves to better distinguish between benign and malignant kidney tumours. But Wilex has also purposefully expanded its spectrum of services by way of acquisitions and it offers services relating to pre-clinical contract research. A large portion of the turnovers already generates comes from US licence agreements for the potential Rencarex product which aims to prevent metastases in the kidneys. A successful increase in capital, which was achieved only recently, provides evidence of the trust investors place in the company, which is also listed on the stock exchange.

Morphosys was founded two decades ago. Today the antibody specialist can be seen as a flagship for Germany's biotechnology industry.
Photo: © Morphosys AG

Efficient Use of Financial Resources
Time and again, Biotech companies are showing that it is possible to widely distribute the development risk and, at the same time, exploit synergies through a multitude of projects. One of these companies is 4SC AG, which is based at IZB Martinsried and has created a large pipeline for drugs to treat cancer and autoimmune diseases. This results in continually growing income. To this end, 4SC is concluding licence agreements with partners from the pharmaceutical and Biotech industries starting from a particular phase, so that it can then tackle the final clinical phase and the market launch together with the partners. An example

Shareholder structure of 4SC, Antisense Pharma, Morphosys und Wilex

Source: own research

Company	Selection of significant investors	Listed company	Free float*
4SC**	Santo Holding (48,1 %), FCP (9,91 %), DVCG/VCG (6,13 %), Heidelberg Capital (5,86 %)	yes	24,50 %
Antisense Pharma***	MIG Verwaltungs AG, S-Refit, gcf - Global Chance Fund, GAF – Global Asset Fund, kfw Mittelstandsbank, Bayern Kapital	no	–
Morphosys	Novartis Pharma (ca. 7 %), Astra Zeneca (ca. 5 %)	yes	ca. 88 %
Wilex	dievini Hopp Bio Tech Holding (31,16 %), Verwaltungsgesellschaft des Golf Club St. Leon-Rot (12,85 %), UCB (15,71 %), TVM Capital Fonds (4,5 %), Merlin Fonds (3,44 %)	yes	30,81 %

* Free float as defined by Deutsche Börse ** management estimates *** percentages not given

of this is the licence agreement concluded with the Japanese partner Yakult Honsha in 2011 for the purpose of commercialising the cancer drug Resminostat; this agreement outlined terms for the revenues from advance payments, milestone payments and subsequent commissions. Through the subsidiary 4SC Discovery GmbH, the company also markets its know-how as a service provider for the pharmaceutical industry. Thanks to a capital increase, 4SC was recently also able to secure additional funding.

Attractive for Risk Capital

With the help of venture capital and private investors, Antisense Pharma GmbH based in BioPark Regensburg is developing innovative drugs to fight against aggressive tumour-induced diseases. In doing this, the company is relying on the immense potential of the active ingredient Trabersen, which can assist the human immune system in fighting tumours and simultaneously inhibit the spreading of cancer cells. The company, which was founded in 1998, has already been recognised with the Deutscher Gründerpreis (German Business Founder Award) and the Bayerischer Innovationspreis (Bavarian Innovation Award) and to date, it has collected more than EUR 90 million in venture capital. For the venture capitalists, it is an interesting investment, because Antisense Pharma is specifically focusing on pre-clinical and early clinical studies, in order to reach the aspired milestones for a multitude of indicators quicker. This reduces the corporate risk and, at the same time, increases the opportunities for successful partnerships and lucrative licence agreements.

Created from a clinical group of researchers at TU München, Wilex AG today generates growing seven-digit turnovers.
Photo: © Wilex AG

Sights Set on International Companies

But the innovative force of the Biotech companies has not only been capturing the interest of cooperation partners of late. Increasingly, the international pharmaceuticals industry is also prepared to acquire the ideas developed in Bavaria by way of purchasing entire companies. An outstanding example of this is the takeover of CorImmun GmbH, which is based in Martinsried, by Janssen-Cilag GmbH, a subsidiary of pharmaceutical giant Johnson & Johnson. Although the heart failure treatment projects being realised by the Biotech start-up, which was only founded in 2006, are still in an early trial phase, the pharmaceutical giant effected the complete takeover in summer 2012 to the tune of USD 100 million according to media speculation. And this certainly isn't an isolated case. Four years beforehand, the second-biggest Japanese pharmaceutical company, Daiichi Sankyo, was prepared to pay the handsome sum of EUR 150 million to purchase U3 Pharma AG. The takeover of the company, which specialises in researching monoclonal antibodies and which was founded based on research results of the Max Planck Institute of Biochemistry in Martinsried, allowed for the further development of promising cancer treatments.

Looking Optimistically to the Future

International companies' interest in the Bavarian Biotech sector shines a light on what the many smaller and medium-sized companies have to offer in terms of creativity and implementability. With their innovative clout in an extraordinary environment, they will also attract the interest of investors from all over the world in the future. The latest example of this is the newly-founded subsidiary of the US venture capital specialist MPM Capital in Munich. From the metropolis on the Isar river, the life science investor is wanting to look out for suitable investment opportunities in Europe.

Norbert Hofmann

"It is important that business models are scalable"

Interview with Helmut Jeggle, Athos Service GmbH, and Michael Motschmann, MIG Verwaltungs AG

Michael Motschmann is a member of the MIG executive board. He is responsible for the selection and supervision of investments.

Mr. Helmut Jeggle is responsible for the life science initiatives at ATHOS Service GmbH, the Family Office of the Strüngmann brothers.

Athos Service GmbH, which is owned by the Strüngmann brothers who founded Hexal, and MIG Fonds are counted among the most important venture capitalists in the German Biotech industry. How many companies from the life sciences sector do you currently have shares in, and how much have you invested to date? How will you continue to build on your commitment?

Jeggle: At present, we have shares in 12 life science companies and in total, we have invested or committed just over EUR 700 million. We are currently devoting more of our energies to the corporate development of the more mature portfolio companies and we are only having an opportunistic look around for new shareholding opportunities.

Motschmann: To date, MIG Fonds have invested around EUR 225 million in 18 life sciences companies. There are always attractive life science investments in our shareholding pipeline, but these are in competition with other shareholding opportunities from other sectors.

What investment strategy are you pursuing? Which companies are you interested in?

Jeggle: As a family-owned firm, we tend to think more in terms of generations. It is thus important for us to identify partners that suit us and are ready to tread new paths with us. Over the last 5 years, we have built up a demanding portfolio in the area of biotechnology. Here, the focal point has been the area of personalised medicine in oncology. But we have also tested other indications, such as the central nervous system, and we have expanded our portfolio to include our latest shareholding, Affiris in Vienna. The challenge for us is to optimally supervise this portfolio using the required resources and assistance. In our partnership with Affiris, we are increasingly concentrating on advanced phase II projects.

Motschmann: Because we regularly invest from new funds, we are constantly on the lookout for new investment opportunities. But to all intents and purposes, these can indeed come from the portfolio of another MIG Fonds company. Generally speaking, companies are developing further at a rapid pace. A portfolio company from an "old" fund may well be a completely different company today than it was at the time when the initial investment was made, not just in terms of its degree of maturity, but also with regard to the residual risk, the remaining holding period and of course the anticipated return. As far as the basic technologies and sectors are concerned, we are fairly opportunistic. It is important that business models are scalable, ideally have a global dimension and satisfy long-term requirements, such as the topics of health, resources and mobility.

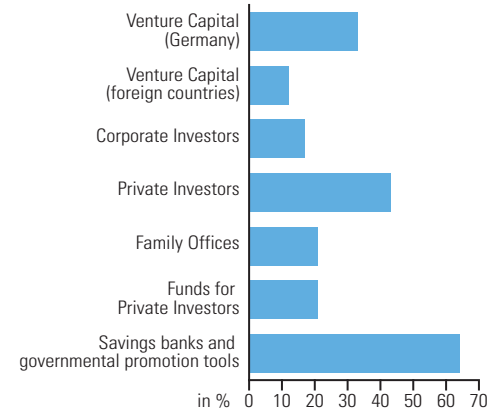
From an investor's perspective, how do you rate Bavaria as a Biotech and medical technology location?

Motschmann: For us, the location of Bavaria is very attractive, which is also reflected in our portfolio. At present, we have shares in some companies in the two metropolitan areas of Munich and Nuremberg-Erlangen. The two cluster management hubs do a good job, especially in relation to rapid integration of start-ups. This in turn results in brisk exchange among companies and enables synergies. The fact that not only is there excellent basic science in the direct vicinity of the clusters, but also the headquarters of large companies, certainly boosts the attractiveness of the location further.

The Interview was conducted by Markus Hofelich.

Types of investors and their participation in financing rounds

Source: Ernst & Young, 2012



"Since 1998, approximately EUR 2 billion have been invested in site expansion projects"

Interview with Claus Haberda, Site Manager, Roche Penzberg

How did it come about that Penzberg is now the largest biotechnology centre in Europe and one of the most important biotechnology sites of the Roche Group worldwide?
The birthplace of industrial biotechnology is regarded to be in Tutzing at Lake Starnberg. In Tutzing, the company Boehringer Mannheim began focussing its efforts on researching and developing new biochemical methods to aid disease diagnosis after tWorld War II. From 1972, this company division in Penzberg embarked on a further expansion project. A former mine site provided the ideal area for increasing the company's production capacities. Since then, there have been constant investments in the Penzberg site – investments in research, development and the production of medicines and diagnostics. Knowledge of biochemistry extends from the time of classic biotechnology to today's modern biotechnology. Since Roche's takeover in 1998 alone, approximately EUR 2 billion have been invested in the site's expansion, which in fact is one of the largest biotechnology centres in Europe to date. Moreover, employee expertise and their enthusiasm for work, networking of the pharmaceutical and diagnostics business areas in the context of personalised medicine, reliability when implementing projects and, last but not least, close collaboration with politicians and authorities are all absolutely essential for success.

Roche continues its expansion venture of the biotechnology site in Penzberg. In 2011, the Swiss pharmaceutical company invested EUR 158 million in the research and development of therapeutic proteins. What objectives are you currently pursuing? What other investments are planned in Penzberg?
This investment is of great significance as it completes the value-added chain at the Penzberg site; from research previously carried out to technical development and the production of biopharmaceutical active ingredients to be launched on the market. The objective was to improve the development of production processes for protein-based active ingredients and the availability of pre-clinical and clinical studies which use biotechnological active ingredients. This reinforces Penzberg's name as the "Centre of Excellent for Therapeutic Proteins". As a general principle, large investments are discussed in the Roche Group; initially independent of a location and based on their necessity. Penzberg must always request these investments and they are therefore keen to impress with their high levels of productivity and excellent innovative strength.

Claus Haberda is Site Manager at Roche in Penzberg.

What role does personalised medicine play today and in the future for Roche? What are Roche's special strengths and the strengths of the Penzberg site in particular in this area?
We are fully convinced that the future lies in personalised medicine. It is precisely for this reason that it represents a key element of the Roche strategy. In Penzberg, scientists from the diagnostics and pharmaceutical sectors are working in close collaboration on new therapies. This generates synergies which are not evident at other Roche sites.

Generally speaking, how do you view the biotechnology and pharmaceutical sector in Bavaria?
The Bavarian state has introduced initiatives that promote both high-quality training (MINT initiative, elite universities) and cross-linking between science and industry (Leading-edge clusters, IZB Martinsried and Bayern Innovativ). Politics in Bavaria has also laid good foundations for high-tech companies, which has resulted in Bavaria's biotech industry being ranked among the best worldwide. However, we must continue to ensure that research and development in particular remain attractive in Germany. Furthermore, I am of the opinion that the detrimental effects of the healthcare reforms for the pharmaceutical industry should also be discussed in the context of job security.

The interview was conducted by Markus Hofelich.

Constant investments through Roche as well as good foundations laid by politics in Bavaria made Penzberg one of the biggest Biotech locations in Europe.
Photo: © Roche Penzberg

"The acquisition of Micromet is the largest single investment Amgen has ever made"

Interview with Richard Paulson, VP & General Manager, Amgen GmbH in Germany

Richard Paulson is VP & General Manager at Amgen GmbH in Germany.

Mr. Paulson, this year, Amgen acquired Micromet for USD 1.16 billion. It was the largest ever transaction involving a German biotechnology company. What makes Micromet so special?

Amgen has always been committed to developing the most innovative new medicines, based on the most advanced understanding of disease states, to treat patients with serious illnesses. Micromet had brought excellent scientists together, and built a promising late-stage cancer drug pipeline, as well as an R&D engine with the potential to generate many more cancer drug candidates well into the future. We believe the Bispecific T cell Engager (BiTE) antibody technology developed by Micromet is one of the most exciting platforms in the world, to develop safe, effective new medicines for cancer patients. Amgen and Micromet were an excellent fit, given our people and our corporate cultures, both of which were science-based and values-driven. We wanted to put Micromet's science and people right at the heart of Amgen's continuously growing R&D efforts, and that's exactly the role they will play, as the new Amgen Research (Munich) GmbH. This is the largest single investment Amgen has ever made, and it signals our commitment to pursuing the very best medical science, both through our in-house R&D capabilities, and through technologies and compounds from partners around the world.

With sites in Regensburg and Munich, Germany is Amgen's only global affiliate with both research and clinical facilities.
Photo: © Amgen GmbH, Deutschland

What is the potential you see for Amgen, from the BiTE technology platform?

With BiTE, we see the potential for a whole new generation of novel therapies, to help patients with cancers that are insufficiently treatable today, and for whom other medicines are not working. For example, the molecule blinatumomab is in development right now for a type of blood cancer – acute lymphoblastic leukemia (ALL) – for patients who have exhausted all other treatment avenues. In clinical studies, this drug has also shown to be active in some patients with non-Hodgkin's Lymphoma, as well as those with ALL. The BiTE technology takes a new approach to treating cancer. It aims to enable a patient's own natural defenses – the immune system – to mobilize the body's T cells to reach cancer cells, attack them, and induce apoptosis (programmed cell death) of just the cancer cells. If successful, this should result in medicines that are both extremely effective in fighting tumours, and also safe and well-tolerated by patients. BiTE is a unique, innovative and clinically confirmed platform. And Amgen's skill in developing and manufacturing complex biopharmaceutical treatments will advance this technology, with the potential to benefit millions of patients around the world.

How important is the German market for Amgen in terms of R&D and sales?

Germany is vital to the future of Amgen, and we have a strong and growing presence here. With Amgen Research in Regensburg and Amgen Research in Munich, we are the only global Amgen affiliate with both research and clinical facilities. That's a testament to the strength of medical science and R&D in Germany. At the moment we have approximately 100 active studies under way across Germany. In Germany we are the leading Biotech company delivering new and innovative medicines to treat serious illnesses such as cancer, osteoporosis and kidney diseases. We are proud that we have introduced three new products in the last two years for the indications skeletal-related events, metastatic colorectal carcinoma and osteoporosis.

The interview was conducted by Markus Hofelich.

"A win-win situation for both sides; the economy and university research"

Interview with Prof. Dr. Willi A. Kalender, Director, Institute for Medical Physics (IMP), Friedrich-Alexander-Universität Erlangen-Nürnberg

Professor Kalender, you have been the Director of the Institute for Medical Physics since its establishment in 1995 – What sets the institute apart?
The decisive characteristic of the IMP is probably its close collaboration with industrial partners for virtually all research projects. Moreover, as a result of the activities of our institute, research organisations have been birthed in Bavaria, nation-wide and throughout Europe, which are heavily subsidised. Even from today's perspective, the decision of the Universität Erlangen-Nürnberg to set up the IMP was also a stroke of luck for me personally. This allowed me to freely choose research topics, contact any competence partners and launch cooperative ventures with the industrial sector.

What have been the most ground-breaking research results of your institute to date?
Here I would simply like to mention Cardio-CT and efforts to reduce the radiation dose in computed tomography. Cardio-CT, i.e. the non-invasive examination of the heart which uses computed tomography, is based on spiral CT technology; technology which I developed during my time at Siemens where I was able to demonstrate its scope for heart imaging. The method was first fully implemented and clinically tested in the university environment in direct cooperation with cardiologists and radiologists. Moreover, the concepts of dosis reduction with tube current modulation and automatic dose stabilisation, which were developed in the late 1990s, are based on spiral CT technology and were first used at the Universität Erlangen. Today, both methods are used around the globe. Collaboration with Siemens was crucial in both cases and a great success for all those involved.

The university is part of the Medical Valley in which around 180 dedicated medical technology companies are located. What makes the combination of research and business stand out?
The climate in Bavaria in this respect has been very positive for a long time; the guidelines provided by the Bavarian Research Foundation mean that funding is only guaranteed for research projects when industrial partners are also involved and are willing to meet at least 50 per cent of the costs incurred. In the medical technology sector, this approach has proven to be successful over a period of many years and it was once again reaffirmed by the establishment of the Medical Valley Cluster which was funded by the German Federal Ministry of Education and Research (BMBF). The university is represented in a large number of funded projects; a win-win situation for both sides – the economy and university research.

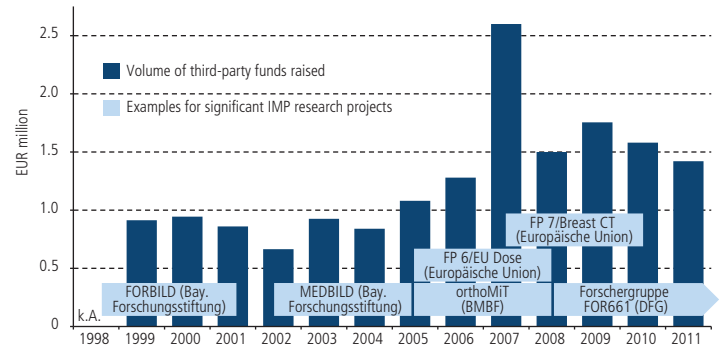
You often travel on business to the USA. What are the strengths of the Bavarian region when compared internationally?
In my opinion, the level of education represents a particular strength of the Bavarian region. In Bavaria and Germany as a whole, an excellent professional and vocational education system has been established for many years. However, this is unfortunately not taken into account in international comparisons. Generally the number of university graduates is recorded but not the quality of their degree results. Moreover, vocational training is rarely considered. Our specialised staff – technicians, precision mechanics, mechatronics technicians etc. – have undergone excellent training in both handicraft and vocational work by international standards.

The interview was conducted by Martin Bellof.

Prof. Willi A. Kalender is Director of the Institute for Medical Physics at the Friedrich-Alexander-Universität Erlangen-Nürnberg, as well as founder and managing director of CT Imaging GmbH, Erlangen.

Evolution of third-party funds raised by IMP

Source: IMP



Trendsetter for health

Small and medium-sized companies are driving forward advancement in medical technology

Be it computer tomographs or highly sensitive measuring devices, high-tech implants or laser applications, Bavaria occupies an internationally leading position in numerous key technologies within the field of medical technology. It is primarily the more than 250 small and medium-sized companies which are time and again pushing forward this development and are reinforcing the location's leading role within Germany.

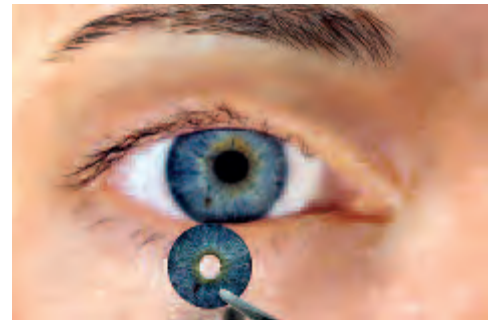
Innovative companies in an excellent environment

Bavaria is synonymous with almost a third of medical technology production and even with more than 60 per cent of electromedical device production in Germany. The companies are also successful on the global markets with their innovations, achieving an export rate of around 70 per cent, and are presently a key economic factor with more than 30,000 employees. Indeed, the trend appears to be climbing further. In Medical Valley European Metropolitan Region Nuremberg alone, around 100 new companies have been founded since 1998. In their research projects and developments, they can count on the proximity to more than 65 hospitals, more than 70 chairs at universities and universities of applied sciences and 20 non-academic research institutes. In addition, the university hospitals in Munich, Regensburg and Wuerzburg are synonymous with the scientific potential of the location. No less important are institutions such as the German Aerospace Centre and the Fraunhofer and Max Planck Institutes. The companies benefit in the case of all the cross-sector and cross-technology cooperations, which are purposefully promoted by the Forum MedTech Pharma network created by the Bavarian Ministry for Economic Affairs. Last but not least, the sector's rapid start-up scene is enjoying a disproportionately high level of commitment from venture capitalists, whereby publicly financed seed funds play just as important a role as private investors. National figures confirm the significance of medical technology. In 2011, it was counted among the three sectors that attracted the greatest level of interest with regard to venture capital, recording capital inflows of EUR 66 million and a total of 77 investments.

Pioneers and market leaders

Medical technology in Bavaria therefore also has a good reputation, because it can demonstrate ground-breaking successes in many areas. One of these renowned pioneering companies is Peter Brehm GmbH, which is based in Weisendorf. In the middle of the 1980s, the company developed a cement-free hip implant made from titanium together with the Accident Surgery department of Friedrich-Alexander-Universität Erlangen-Nürnberg. During the same decade, the company made a splash with the artificial replica of a knee joint, and a decade later there followed the first robot-suitable hip implant. At the start of this millennium, the company ultimately created a new quality level with regard to the durability of artificial joints with the clinical introduction of the Brehm precision knee system. This was also met with resonance on an international level. In the case of the hip revision implants, which enable the exchange of individual parts, the pioneers from Franconia have long since been the market leaders in Europe.

Innovations in the area of imaging devices for use in ultra-modern operating theatres also have a long-standing tradition in Bavaria. Ziehm Imaging GmbH based in Nuremberg, for instance, was founded 40 years ago and since then it has pushed development in mobile X-ray technology to the fore. In 2006, the Franconian firm thus positively ushered in a new imaging era with the first fully digital, mobile C-arm. Ziehm Imaging is being spurred on by its own innovative force, by investing



In 2008, Human Optics launched the first foldable artificial iris on the market and thus helped individuals with eye problems to enjoy improved sight again.
Photo: © HumanOptics

15 per cent of its turnover in research and development each year.

Demand from all over the world
HumanOptics AG, which was founded in 1999 in Erlangen, is synonymous with innovations in the area of optical medical technology. Seven years after it was created, the company, which was initially financed with venture capital, made the jump to the Frankfurt stock exchange. In 2008, HumanOptics then made the professional world marvel, as it launched the first foldable artificial iris on the market and thus helped individuals with eye problems to enjoy improved sight again. The company also produces intraocular lenses, which are used in treating cataracts. Here, the estimated market growth lies at six to eight per cent yearly and the lenses are therefore growing in significance as an alternative to laser treatments. With its sales network in more than 40 countries, the optical specialist can in the future even benefit from the above-average opportunities for growth in Asia. Prospects such as these make investors prick up their ears, too. In February 2012, the Swiss holding company Medipart AG became the majority shareholder.

Successful service providers
Bavarian medical technology hasn't just created efficient networks. Service providers, which help other companies in developing and producing innovations, have also sprouted. One of these providers is Corscience GmbH & Co. KG based in Erlangen, which was founded at the start of the millennium and primarily focuses its energies on the development of diagnostic and treatment devices for cardiovascular diseases. In addition to the services, the B2B company offers completed basic technologies as well as production of devices on customer order. One of its latest developments

"The location can compete with international leading centres"

Interview with Dr. Peter Terhart, Chairman, S-Refit AG

Dr. Terhart, what makes Bavaria as a location for medical technology so special and thus interesting to investors, too?
The research and medical treatment infrastructure that has grown over the years is just as much an international example as the corporate landscape in the sector of medical technology. Furthermore, the Free State's high-tech offensive has ushered in a key development process. It is indeed a marathon as opposed to a sprint. But even now, the location can compete with international leading centres. Key reforms in patent systems have contributed to this, as has the foundation of an organisation for better commercial exploitation. This is the base on which leading research thrives and this attracts investors.

Which areas are companies, in which S-Refit is currently invested, operating?
One of the most interesting examples is Cerbomed, which is based in Erlangen. By way of nerve simulation with electrical pulses, it is developing new treatments for neurological diseases such as depression, pains and epilepsy. There is still an immense requirement for this on a global scale. Aceos, which is based in Fuerth, is synonymous with the trend towards preventative measures in healthcare. Among other things, it has developed a new measuring device for efficient endurance training.

Can you help the companies beyond the start phase?
A nucleus is created with us in Bavaria, both in BioPark Regensburg and in Medical Valley EMN. Afterwards, the companies have to strike out on their own at some point. If we, together with Sparkasse Erlangen, invest through medTECH Capital Fonds which was initiated by Sparkasse Erlangen, we want to make the companies attractive to other investors, too. And that works. Generally speaking, we are currently recording, among other things, a high level of interest in Bavarian companies on the part of large medical technology funds from Switzerland.

Dr. Peter Terhart is heading S-Refit as sole member of the Management Board. He is also Chairman of the Board of the German Private Equity and Venture Capital Association.

Product focus of selected MedTech-SMEs

Source: own research

Company	Product focus	Founded
Ziehm Imaging GmbH	Mobile X-ray based imaging – focus on intraoperative imaging and innovative X-ray technology	1972
Peter Brehm GmbH	Spine-, hip- and knee-implants	1981
CT Imaging GmbH	Medical Imaging and Image Processing – focus on Computed Tomography systems including Micro-CT	1997
Human Optics AG	Ocular implants – focus on intraocular lenses, Add-on lenses and artificial iris	1999
Corscience GmbH & Co. KG	Cardiovascular therapy and diagnostics – focus on vital parameter sensor systems, electro-therapy, algorithm, wireless transmission technologies as well approval and production	2001
Cerbomed GmbH	Neuromodulation – focus on transcutaneous Vagus Nerve Stimulation for patients with hard-to-treat neurological and psychiatric illnesses	2005
Metrilus GmbH	Special applications 3D cameras – focus on Time-of-Flight (ToF) cameras	2010

is a small sensor, which detects cardiac arrest or apnoea within a few seconds through being stuck on to the throat of an unconscious individual; it can thus provide rapid information for implementing immediate measures.

From the university to starting a company

There certainly isn't a lack of promising start-ups nowadays. As a specialist in the computer tomography (CT) sector, CT Imaging, which was created as a spin-off from the Institute of Medical Physics (IMP) of the Friedrich-Alexander-Universität Erlangen-Nürnberg, is thus developing new procedures for medical imaging and image processing. The company already has eight patents issued and 11 patents published, and is focusing on high-resolution CT systems, which are just as much in demand among pharmaceutical companies as well as among further education establishments and industrial users. The world's first dual source micro CT system, for instance, with its extremely short scan times is used in research with regard to in vivo small animal imaging. In turn, a dedicated mammography system allows for tumours in the female breast to be diagnosed at an early stage. As the leading project in the Medical Valley top cluster, this breast CT is being promoted by the Federal Ministry of Education and Research (BMBF). Metrilus GmbH, which was founded from the Friedrich-Alexander-Universität Erlangen-Nürnberg in 2010, was also able to make use of aid money from the BMBF. The company has also already been honoured with prize money as the winner of the Northern Bavaria Business Plan Competition. Metrilus GmbH develops software products for real-time recording of 3D data for so-called time-of-flight cameras. Among other things, this technology enables more efficient respiratory measurements or clearer recording of beating hearts, too.

Venture capital for new ideas

Cerbomed GmbH based in Erlangen is counted among the companies, which in addition to public aid money can also build on solid funding through venture capital. The firm, which was founded in 2005, was provided with assistance by a whole range of venture capital firms early on, in order to enable the development of an innovative neuro simulation technology. It is aiming to allow individuals with neurological and psychiatric diseases to have an improved quality of life while simultaneously incurring fewer treatment costs. The company has also received European approval (CE symbol) for several indications, including one in August 2012 for the vagus nerve simulation in the treatment of chronic pain. All too often, drugs have not achieved the desired effect for this indication, which is among the most widespread conditions in industrialised countries. Cerbomed is thus symptomatic for what medical technology from Bavaria can achieve: helping people and, at the same time, tapping into an immense market potential.

Norbert Hofmann

The Healthcare of Tomorrow

Four examples from Medical Valley EMN

In Medical Valley EMN and thus in Bavaria, interdisciplinary teams of researchers from business and science are developing solutions for the healthcare of tomorrow along the leading themes of Diagnostic Imaging, Intelligent Sensors, Treatment Systems and Ophthalmology.

Diagnostic Imaging – "Breast Cancer Computerized Tomography Scan" Research Project
On average, every eighth woman in Europe and North America develops breast cancer during the course of her life. Being diagnosed as early as possible is definitive to the disease being treated successfully. In the "Breast Cancer CT Scan/Integrated Breast Care" projects, concepts for a gently and highly sensitive diagnosis of breast cancer are being developed, which record the entire care process for women with a risk of breast cancer. A central element of the project is the transition from the 2D mammography to the 3D layered imaging, which allows breast cancer to be detected even earlier on and exposes patients to a lower dose of X-rays and contrast agent.

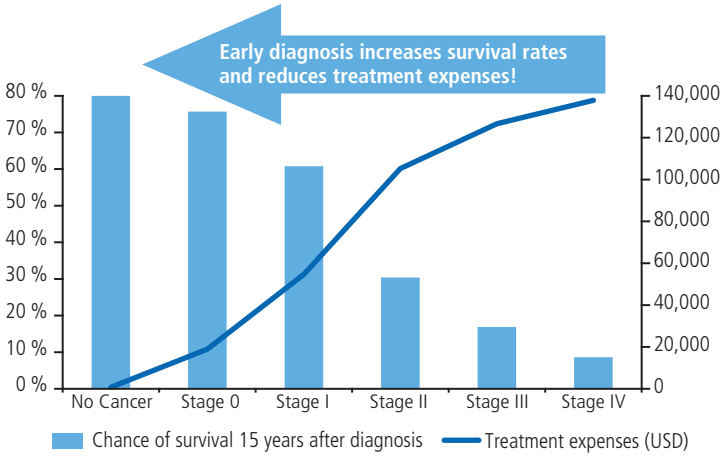
Intelligent Sensors – "Barrier-Free Health Assistance" Research Project
In addition to stroke, dementia is known as one of the "epidemics of the 21st century". The forecast for Germany by 2050 is that the number of people suffering from dementia will increase by 100 per cent to 2 million. In the "Barrier-Free Health Assistance" project, partners in the cluster are developing telemedicine solutions and service concepts that allow senile dementia patients to live in their own home for longer and, at the same time, to relieve carers and relatives of their burden. It is thus a declared objective of the project to considerably reduce the costs for this group of patients, their relatives and the health insurance companies.

Treatment Systems – "Osteofit 2030" Research Project
In 2004, of the total healthcare costs in Germany (which amounted to EUR 225 billion), more than 5 per cent was spent on rheumatoid arthritis, osteoarthritis and osteoporosis (for the purposes of comparison, cancer was 8 per cent). As demographics are changing, these costs will increase even further. In the "Osteofit 2030" project, new revision and individual implants with new, nanostructured surfaces are being developed within the cluster to reduce the rate of infection and speed up the growing process. Due to the longer service lives of the implants and better treatment, there is considerable potential for savings to be made and patients' quality of life will enhance considerably.

Ophthalmology – "Low-Cost Fundus Camera System" Research Project
In third-world countries, the health of many people is alarming – medical care is only possible in limited circumstances due to a deficient infrastructure and the high costs of modern devices, among other things. A low-cost telemedicine Fundus camera system is being developed in Medical Valley EMN for detecting diabetic and hypertensive retinopathy and glaucoma early on in third-world countries. With this system, health organisations in developing countries can prevent diabetic blindness among other things with a small medical infrastructure.

Jörg Trinkwalter

Importance of breast cancer prevention – Diagnostic Imaging plays a key role in early diagnosis
Source: American Cancer Society



"Bavaria's university hospitals are absolutely world class"

Interview with Michael Sigmund, Head of Communications, Siemens Healthcare

Michael Sigmund is Head of the Communications Department at Siemens Healthcare. He is also a board member at Medical Valley EMN and Forum MedTech Pharma.

The technological and medical activities of Siemens AG are pooled together at the Siemens Healthcare branch, based in Erlangen. What is your unique selling point and how do you assert yourselves on the market in light of the international competition?

Siemens Healthcare is one of the global market leaders in the imaging sector. This is thanks to our impressive innovative strength and our extensive expertise in the area of medical technology development. In fact, it is precisely these strengths that enable Siemens to continue to launch groundbreaking technologies onto the market which open new windows of opportunity for medical diagnostics – such as our Biograph mMR system; the world's first integrated whole-body molecular MR system with simultaneous data acquisition technology. In light of the growing cost pressure in the healthcare sector worldwide, it is becoming increasingly important that cost-effective, and particularly long-term, viable solutions, are made available. It is only then that we are able to position ourselves effectively against the international competition. In this sector alone, Siemens has developed many different systems over the past two years – from the X-ray machine to the MRI scanner – which have also been successful in emerging countries.

What pioneering new technologies are you currently working on?

We are continuing to work intensively towards developing technologies that reduce the dose of radiation required – for example, we are endeavouring to create new reconstruction algorithms for computer tomography. In addition, we are developing efficient software tools for the imaging sector, which will help us support the diagnostic processes of our clients for various disease patterns such as Alzheimer's. In the laboratory diagnostics sector, we embarked on a partnership with Illumina in 2011 – a market leader in the area of genetic sequencing – in order to further develop next-generation sequencing technology for the prompt and precise detection and treatment of infectious diseases. Furthermore, as part of our sector initiative "Agenda 2013", we have decided to expand our range of systems available in the mid-price range.

Siemens Healthcare is one of the global market leaders in the imaging sector.
Photo: © Siemens Healthcare

With which key players from the Medical Valley MedTech cluster do you cooperate intensively?

An important and long-term cooperation partner for us is the Universitätsklinikum Erlangen (Erlangen university hospital). For example, we are working together to develop a range of innovative diagnosis methods for breast cancer; the Fraunhofer Institute is also involved here as a project partner. We have also established excellent partnerships with a few SMEs from the Medical Valley, such as sepp.med GmbH in the IT healthcare sector. Moreover, there are a number of other partners and medium-sized companies which are involved with subcontracted activities.

What, in your view, are the overall strengths of the MedTech location in Bavaria when compared internationally?

Bavaria's university hospitals and non-university medical institutes are what I can only describe as "world class" in many areas which are important for medical technology – for example, minimally invasive medical treatment. Such an environment is of utmost importance for innovative medical technology manufacturers such as Siemens, as we require clinical expertise from high-ranking, practising doctors so that we develop the right technologies. Furthermore, we also benefit greatly from the excellent academic training provided here in Bavaria which results in many highly qualified staff for the medical technology sector.

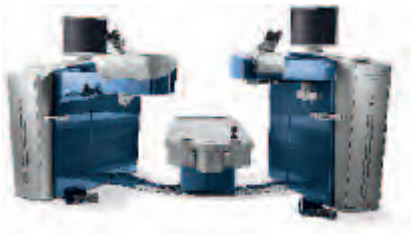
The interview was conducted by Markus Hofelich.

Success with eye laser technology

Wavelight GmbH: Synergy potential in the Alcon Group

The Erlangen region represents an attractive and successful network in the medical technology sector. It is also from this field that the eye laser specialist Wavelight was birthed. Eleven years after its establishment, Wavelight was taken over by the US company Alcon and today plays a key role in the refractive surgery sector.

Ups and downs on the Frankfurt Stock Market
The medical technology company Wavelight features among the most remarkable start-ups of the 1990s in Bavaria. After its launch in the MedTech stronghold (Erlangen) by the former Chairman of the board, Max Reindl, the company progressed to become a technological leader in the area of refractive surgery. In 1999, Wavelight was listed on the Neuer Markt of the Frankfurt Stock Market. Following the closure of the Neuer Markt, Wavelight switched to the Prime Standard stock market segment in January 2003. However, even the company itself did not always have a smooth ride. After a rapid initial growth phase and attempts to branch into other areas of medical technology, the share price plummeted. From this point on, Wavelight focused again on its core business – refractive surgery – and sold all its other business divisions.



World-class laser and diagnostic systems are invented in Bavaria. Today, Wavelight is a fully owned subsidiary of Novartis.
Photos: © Wavelight GmbH

Takeover by Alcon
In 2007, the US company Alcon Inc. secured a majority stake in Wavelight following the presentation of a takeover bid to the shareholders. Back then, Alcon was a subsidiary company of the Swiss Nestlé Group, belonging to the largest product suppliers involved in ophthalmology worldwide. The motivation behind the takeover was to capitalise on the synergy potential in the company network, especially in the areas of marketing, sales, research and development, in order to make the laser systems provided by the Erlanger company even more successful on the market. Since 2009, Wavelight has been a wholly owned subsidiary of Alcon Inc.; a company itself which was sold by Nestlé to the Swiss pharmaceutical company Novartis in 2010.

Precision is crucial
With around 230 employees, today Wavelight is ranked among the leading companies worldwide in the development and production of modern diagnostic and surgical technology for correcting vision defects. It's all about developing and producing innovative laser systems for ophthalmic surgery. The clients are clinics and ophthalmologists. "Our laser and diagnostic systems enable a very careful and highly precise correction of vision defects", explains managing director Martin Reichelt. "In refractive surgery, Wavelight has created a platform to allow for treatments especially tailored to the patient's needs." Since 2004, the company has manufactured all its products in the newly-built production site based in Pressath, the Upper Palatinate. "Laser production is high-precision work and in Germany we have an excellently trained workforce for this purpose", says Reichelt. Moreover, as the company headquarters, Erlangen provides an opportunity for excellent cooperation with the university there and an impressive network of suppliers and service providers from the region.

A large eye care budget
With Alcon, into which the former company Ciba Vision – with its contact lens products – was integrated, Novartis is keen to cover the entire spectrum of ophthalmology and is currently present with its products in roughly 180 countries around the globe. The Group operates branches or sales offices in 75 countries. Therefore, significant investments are being made in the areas of research and development in particular, with the largest Group budget for this sector worldwide: approximately USD 5 billion for a period of 5 years.

Bernd Frank

Expert statements regarding Bavaria as a healthcare location

Prof. Dr. Axel Ullrich, Director, Department of Molecular Biology, Max Planck Institute of Biochemistry:

"One of the biggest strengths of Bavaria as a business location is the political support. When players from politics recognise economic potential, they work consistently on tapping into this potential, too. I personally was therefore not surprised that the German biotechnology adventure started in Bavaria."

Prof. Dr. Willi A. Kalender, Director, Institute for Medical Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg:

"In my opinion, the level of education represents a particular strength of the Bavarian region. In Bavaria and Germany as a whole, an excellent professional and vocational education system has been established for many years. Our specialised staff have undergone excellent training in both handicraft and vocational work by international standards."

Richard Paulson, VP & General Manager, Amgen GmbH in Germany:

"With Amgen Research in Regensburg and Amgen Research in Munich, we are the only global Amgen affiliate with both research and clinical facilities. That's a testament to the strength of medical science and R&D in Germany."

Michael Sigmund, Head of Communications, Siemens Healthcare:

"Bavaria's university hospitals and non-university medical institutes are what I can only describe as 'world class' in many areas which are important for medical technology – for example, minimally invasive medical treatment. Such an environment is of utmost importance for innovative medical technology manufacturers such as Siemens."

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