BIO NRW

Cluster Biotechnology
North Rhine-Westphalia

Starting up in NRW – companion for your life science StartUp

Content

Dear reader,

Biotechnology delivers answers and solutions to the grand challenges of today and tomorrow. Biotech products and solutions provide invaluable answers to our society's needs and challenges like healthy living and ageing, limited energy supplies or the climate change. Successful biotech centers promise high-paying jobs and potential future growth, and have an clear economic impact for the inhabitants of a region.

The business conditions especially for young biotech companies in Nordrhein-Westfalen are excellent and globally highly competitive. In international rankings of biotech clusters North Rhine-Westphalia is represented within the top ten most powerful in the world.

At BIO.NRW, which is the official state cluster for Biotechnology in North Rhine-Westphalia, initiated by the state government in 2008, we actively support NRWs´ biotech cluster structure and do our best to strengthen the regions´ business conditions and competitiveness.

As an entrepreneur in the biotech cluster of NRW you will find many different sources of support. In this brochure we will try to show you some of the extensive expert know-how sources there is to find in NRW, especially with regards to funding, business development, organizational, legal- and IP questions. You can also read about what to consider when founding a company in NRW, how to take an idea or technology to market and how BIO.NRW supports researchers in transferring academic research into sustainable businesses. BIO.NRW supports businesses and entrepreneurs in all stages and offers a wide range of different support, training, coaching, networking, planning of fairs, as well as access to funding and financial support programs and other incentives.

In investor circles, entrepreneurs and companies in North Rhine-Westphalia get a precise, hand-picked platform for finding support and presenting their ideas to a selected group of private and institutional investors. Together with academics in the process of transferring academic research into successful and productive businesses, experienced business developers, coaching sessions for young biotech companies are organized or alternative financing models are discussed.

For over a decade, the (start-up) biotech business development scene in Germany has been suffering from a lack of available risk capital, combined with a rather unfavourable and internationally barely competitive tax law situation. Thus, the sources of private equity, venture capital, foundations and public funding that are within reach for a biotech company are selective, and alliances with global companies of the pharmaceutical or chemical industry are becoming more important. As a founding associate member of EIT Health, one of Europe's biggest cross-industry consortium, with an overall budget of up to EUR 2 bn. and with over 140 partner organizations from 16 European countries (www.eithealth.eu), BIO.NRW provides biotech entrepreneurs and researchers with an outstanding source of networks, funding and knowledge.

BIO.NRW has strengthened collaborations within the cluster and internationally organizing, taking part and actively contributing to an established series of events, that will continue in 2016 (for details please visit www.bio.nrw.de). I invite everyone to take advantage of our offerings and to engage with our state's extensive and excellent biotech community, one of the leading biotech hotspots in the world.

Yours sincerely,

Dr. Bernward Garthoff,
Official Representative for Biotechnology of the
Federal State of North-Rhine Westphalia

North Rhine-Westphalia – a biotech hotspot in Europe

North Rhine-Westphalia is situated in the heart of Europe and the most populous (18 million inhabitants) and densely settled of the 16 federal states of Germany. Its major metropolitan areas are the Ruhr region (5.2 million residents) and the Rhineland (3.5 million residents). With a higher density of universities and research institutes than any other part of Europe, combined with major global corporations alongside numerous small and medium-sized enterprises (SMEs), NRW is a one of Europe's top performing regions in regard to production, research and innovation.

North Rhine-Westphalia's state government has established a number of technology clusters to create a favourable climate for innovation. North Rhine-Westphalia's biotechnology cluster BIO.NRW is the cornerstone in Germany's strategy for the biotechnology sector and is promoting co-operation between business, research, investors and policy-makers.

The majority of the biotechnology patent applications in Europe originates from North Rhine-Westphalia. North Rhine-Westphalia has led the development of the biotechnology sector to become one of the most important economic sectors in Germany. As much as 360 life science companies including 89 core biotech compies (according to OECD standards) are actively contributing to the process of making NRW into the leading center of innovation in Europe.

Educating talented scientists is one of the most important investments into the future of North Rhine-Westphalia. Nowhere else is the transition from an industrial to a bioeconomy more apparent than here. The Ruhr Valley in particular has undergone enormous changes in recent decades. As the traditional coal mines and steel mills disappeared, communities and their political leaders became engaged in an intense search for new economic opportunities that would bring new jobs and prosperity. Life sciences became one of the answers and the key to the success was an educated workforce.

Highest accumulation of academic institutions in the EU

Today, the Rhine-Ruhr region has a higher density of universities and colleges than any other part in Europe. About 600,000 students are studying at the 71 universities and technical colleges, amongst which the field of natural and engineering sciences are strongly represented. Six of the twelve largest universities in Germany are located in NRW and two out of eleven, the University of Cologne and Aachen University (RWTH), have been labelled "Elite University" from the state of Germany. Beside the highest national density of universities, each of the four large German research societies, namely the Max Planck Society, the Helmholtz Association, the Fraunhofer-Gesellschaft and the Leibniz Association are running several research facilities in NRW.

The Jülich Research Center (FZJ) is Germanys largest research facility employing over 5,700 staff in NRW, has recently become extended by a unique institution: the first research institute in Europe, which is dedicated exclusively to bioeconomy research, the Bioeconomy Science Center, BioSC, founded for Euro 58 million in 2011. The BioSC is a joint initiative of the FZJ and the universities of Aachen, Bonn and Düsseldorf and part of the pioneering bio-economy strategy of the state government.

Successful technology transfer

In the area of biomedical research, the Max Planck Society has established a noteworthy institution in the Ruhr valley: The "Lead Discovery Center" (LDC) in Dortmund works at the intersection of academia and industry. LDC has successfully implemented a new concept of technology transfer, it takes up drug targets and candidates from basic academic biomedical research and develops these candidates into lead structures, using a number of high throughput screening technologies. Cologne-Bonn is another area in NRW which has developed into an internationally renowned hotspot for aging related diseases. The German Center for Neurodegenerative Diseases in Bonn (DZNE), the Cologne Cluster of Excellence for Cellular Stress Response in Aging-Associated Diseases (CECAD) and the Max Planck Institute for Biology of Aging (MPI-Age) act in concert to perform cutting-edge basic research in this area.

Intellectual property

Intellectual property (IP) rights concern the protection of creations of the mind, but they are also about protecting a commercially relevant product, e.g., enabling the right to turn research into money. IP rights are the most important assets Biotechnology Companies can rely on. However, having a large patent portfolio can be very costly and therefore it is of great importance with a meaningful IP strategy.

What is intellectual property?

Intellectual property concerns the ownership of ideas, concepts and ingenuity. Intellectual property rights protect creations of the mind and comprise mainly patents, trademarks and designs. Patents can only be sought for inventions providing a technical solution to a problem. As such you cannot obtain patent protection in relation to a brand, a business idea or design feature, but you may utilise trade mark, copyright and design protection instead.

The deal between IP owners and the public

In a patent and/or a patent application, IP owners disclose to the public how an invention works, such that anyone who may need to find other unique solutions to similar problems may rely on this knowledge. Patents also stimulate the development of technology because a patent grants a monopoly for some time as it restricts others from exploiting the invention commercially, for example, selling and manufacturing a product being patent protected. The commercial exclusivity obtained through patents usually has a life span of 20 years, provided that the required maintenance fees are paid. Any party that makes commercial use of the invention being patent protected without permission of the patentee may be sued for infringement.

After expiry a patented technology is in the public domain, and can be exploited by anybody.

How to obtain patent protection

Because a technical solution to a technical problem forms the basis of a patent, not only products can be protected by patents, but also methods and uses of products. To be patentable, the technical solution needs to meet three main criteria: it has to be novel, it has to be based on inventiveness and it has to be industrially applicable.

Many reasons to apply for a patent

There are many reasons to apply for a patent. It may help preventing plagiarism, it may get you ahead in the competition, or it may help exclude competitors. Whatever the reasons, the ultimate reason for seeking patent protection is to secure a return on investment. For a company, it is therefore important to make sure that existing and new patents support the current business strategy. Competitive advantage may be obtained from market exclusivity, or the sole right to use the invention commercially, and in addition, the value of the company may also be enhanced.

As such, the decision to obtain patents is a business decision, where the costs for obtaining and maintaining a patent should be weighed against potential future earnings.

Another potential benefit of obtaining a patent is that it may improve the odds of attracting a business partner. When a business partner knows that they are getting access to technology that is patent protected, they may be willing to invest more. If you are not in the business of manufacturing or using the invention in-house, you may sell or licence your rights to the invention, thereby generating earnings.

As regards young biotech companies, patents play another peculiar role, which is providing value. Generally speaking, young biotech companies have only three assets: (i) their people's ideas and knowledge, (ii) their technical equipment, and (iii) their technology, coined into IP rights. Asset (i) is extremely volatile as employees may leave the company, and asset (ii) has a limited lifespan due to depreciation and outdating. Thus, asset (iii) remains an asset without which investors would not invest.


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Patent protection – a driver of innovation

IP plays a very special role in the life science industry because no other technical discipline is so much characterized by small ventures which seek investments, and IP is the most important asset they can offer.

The World Health Organization (WHO) publishes a list of the 300 essential pharmaceuticals, out of which 297 were once patent protected, while 3 still are. This illustrates that in Pharma, who is the major exploiter of Biotechnology, patent protection is one essential driver for innovation. We all need new drugs, and without patents, the development of new drugs would come to a rest.

IP strategies are all about protecting a commercially relevant product, not merely about covering a new technical solution. As such it becomes important to consider IP strategies and technology in light of market needs. The reverse situation, where the needs of the market and knowledge of IP drive technological developments into new territories, may also create opportunities for protection of business oriented IP.

A meaningful IP strategy

Developing an IP portfolio can become a severe financial burden, especially for young biotech companies, which at the same time need IP protection most. This is a paradox situation and requires educated decisions with respect to a suitable and meaningful IP strategy.

We asked Dr. Andreas Hübel and Dr. Ulrich Storz, biotech experts at Michalski Hüttermann & Partner Patent Attorneys, how they assist their clients in finding a meaningful IP strategy:

"We helped numerous clients to sort out which technology is commercially relevant for seeking patent protection, and very often we found possibilities to reduce the patent portfolio to a financially and commercially reasonable volume. Some biotech companies have a technology they keep on developing further and they file patents for every incremental improvement of their basic technology. Some companies overachieve their goal in such way that additional patents do not proportionally add value. The resulting large patent portfolio becomes very costly and exhausting for a young company. Rather than paying for a large patent portfolio, they better invest elsewhere in their organization. For instance, in improving the process of transferring research and technology to marketable products",

Biotech IP requires specialists

Biotechnology is probably the most challenging field of IP, not only because of its technical complexity, but also because of the ever changing legal framework. The discipline is overrepresented in the respective patent acts, with a number of exceptions and special regulations that are unique to biotechnology. Further, the jurisdiction related to patent eligibility, enablement requirements, inventive step requirements and questions of infringement is still a moving target, unlike in other disciplines, where these issues can be considered settled.

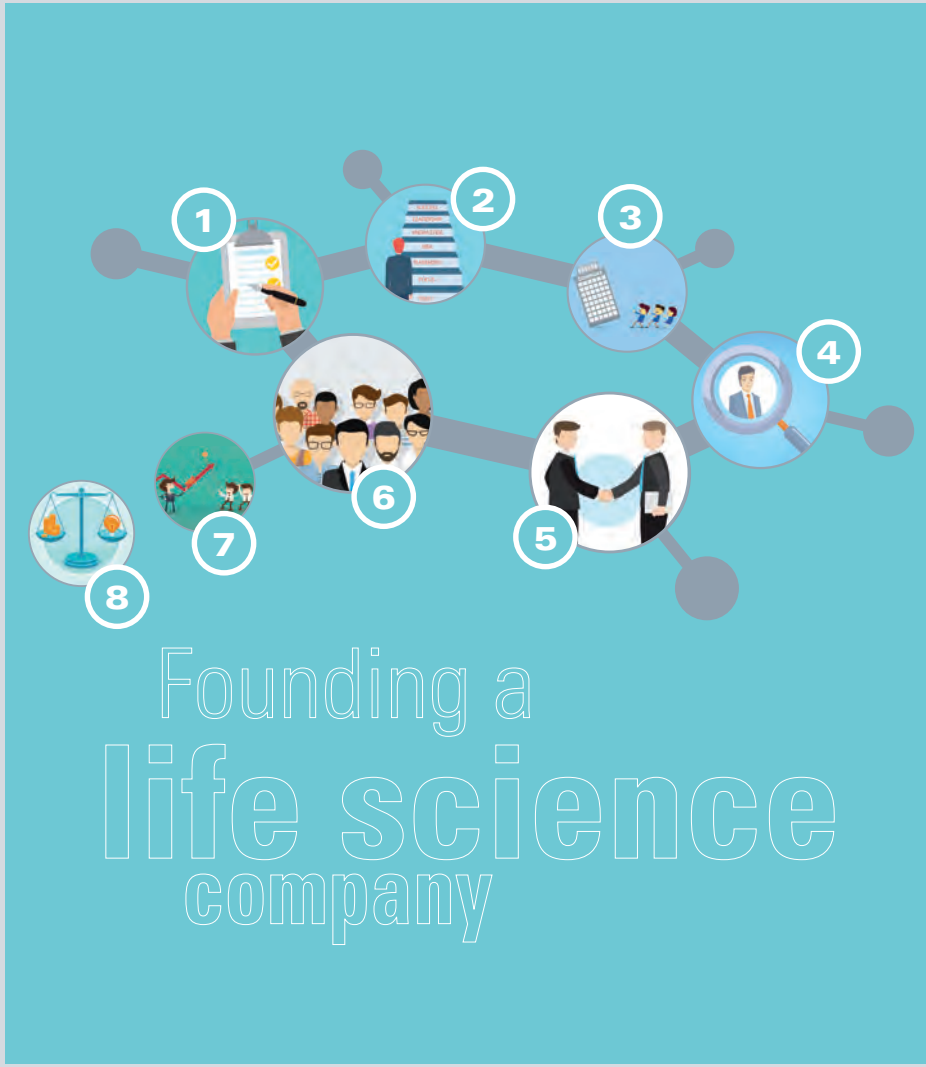
New developments at the horizon include the formation of patent pools (e.g., in non-invasive prenatal testing or genome editing technologies), as well as the merger of biotechnological tool with other technologies with other technologies (e. g., antibody drug conjugates, or high throughput sequencing technologies). All these developments require a high degree of specialization and expertise including an interdisciplinary atmosphere. In North Rhine-Westphalia there are many patent agencies and attorneys represented with specialist competence within the biotechnology industry.

Don't forget IP if you start a business

Startups should be aware that an early on solid IP-strategy is one of the key factors to future business success. A strong IP-portfolio not only protects your company's core technology from your competitors, but can help to attract investors or potential acquirers and offers an additional opportunity to get revenue from licensing.

The following checklist can help Startups developing a successful IP-strategy:

- Identify the most valuable technologies for your products
- Conduct prior art searches for relevant patents and utility models in your market segment, ideally with the help of a patent attorney, in order to answer the following questions:
  - Who are your competitors in your market segment and which patents do they hold?
  - Which of the patents and utility models may prevent or limit the protection of your technology?
- Draft strong patent application and file it with a patent office before disclosing details of your technology to third parties; consider follow-up patent applications
- Identify potential names and designs for your company and your products and protect them
- Check domains for potential company names and reserve them
- Setup efficient and stringent project and contract management



Founding a life science company

Each entrepreneur is unique, each career differently, no business model similar to the other one, each story is special. Is there despite differences some similar success criteria? Perhaps there is; NRW is buzzing from start-up support activities, there are incubators, business plan competitions, networking events, trade fairs and much more. Nord Rhine Westphalia is the place to be when founding a life science company!

When building a life science company, it is important to have the right management, access to funding, consultants, lawyers, adaptability, timing and location. It always starts with the science, but then it is important to focus on management, adaptation, timing, location and funding. With a long-term vision, an entrepreneurial spirit, good management, drive and passion, you will possess the keys to build a successful biotech company.

1. Writing the Business Plan

The value of a business plan simply cannot be overstated. Most investors look through more than a hundred plans every year and you now must catch the reader's interest, otherwise you may not even make it to the initial analysis round. Therefore, it is imperative that your business plan is well prepared and provide the target audience with confidence that your technology will lead to revenue, profit, and a significant market share.

2. Building sustainable life science start-ups in NRW

Here is a small overview of useful information to guide you through the first steps of setting up your own business in Nord Rhine Westphalia. BIO.NRW is a great community to help you with, networking, advice, business plan advisory, founder competitions and can recommend consultants, marketers, accountants, lawyers, patent attorneys and funders.

3. Setting up the company

To minimize personal liability, it is a good idea for start-ups within the life sciences to either set up a GmbH, a company with limited liability or a Unternehmergesellschaft - UG – a "small" company with limited liability. The minimum capital for a GmbH is Euro 25.000, and the minimum capital for a UG is Euro 1. Establishing a GmbH may require more money upfront, but often the increased financial credibility pays off. "There was a time when the English private limited company (Ltd) was fashionable, but since the UG exists, the English Ltd. or other foreign vehicles are much less attractive," says Dr. Kracht, attorney at Kracht+Strohe Rechtsanwälte.

4. Find a good lawyer

A good lawyer will become a key advisor in the early stages of your company, so it is crucial to seek out quality legal advice in the field of your startup. Some large law firms have special incentives for start-ups, often with fees deferred until a funding event happens. In terms of company formation, make sure you choose the company structure that fits your business model best.

Your intellectual property (IP) is one of your most valuable assets, so make sure you secure it early and well. If you are filing your own patent, craft the claims so that your technology is protected as broadly as possible; if you are licensing IP (for example, from a university), do this early and seek your lawyer's counsel to make sure the license terms are acceptable.

5. Engage a cofounder

When starting a company, find one or more cofounder(s) with complementary skill sets. If you are a cancer biologist and your business idea is to develop new cancer therapeutics, find someone with pharmacology or drug development experience. If you have a clinical background and are developing a medical device, find an engineer. Having a cofounder has multiple benefits, from expanding the company's skillset, to having a sounding board and accountability partner.

6. Build the right team

A strong team with the best people you can recruit is a key asset for a startup. Faculty cofounders mostly remain involved as advisors or board members. If your team is made up of academics, it can be extremely helpful to find an experienced entrepreneur or executive with startup experience. A youthful team is great, but an experienced person will help giving you credibility in front of investors.

7. Use incentives

At the very early stage, you will not have the funding needed to pay any salary. The solution is to give cofounders and investors equity or shares in your company tied to a vesting schedule, allowing your cofounders and early employees to participate in the ownership of your company. Initially these company shares will be worth very little, but the idea is to incentivize high-quality work that will drive up the value of the shares with a large up-side to the shareholders.

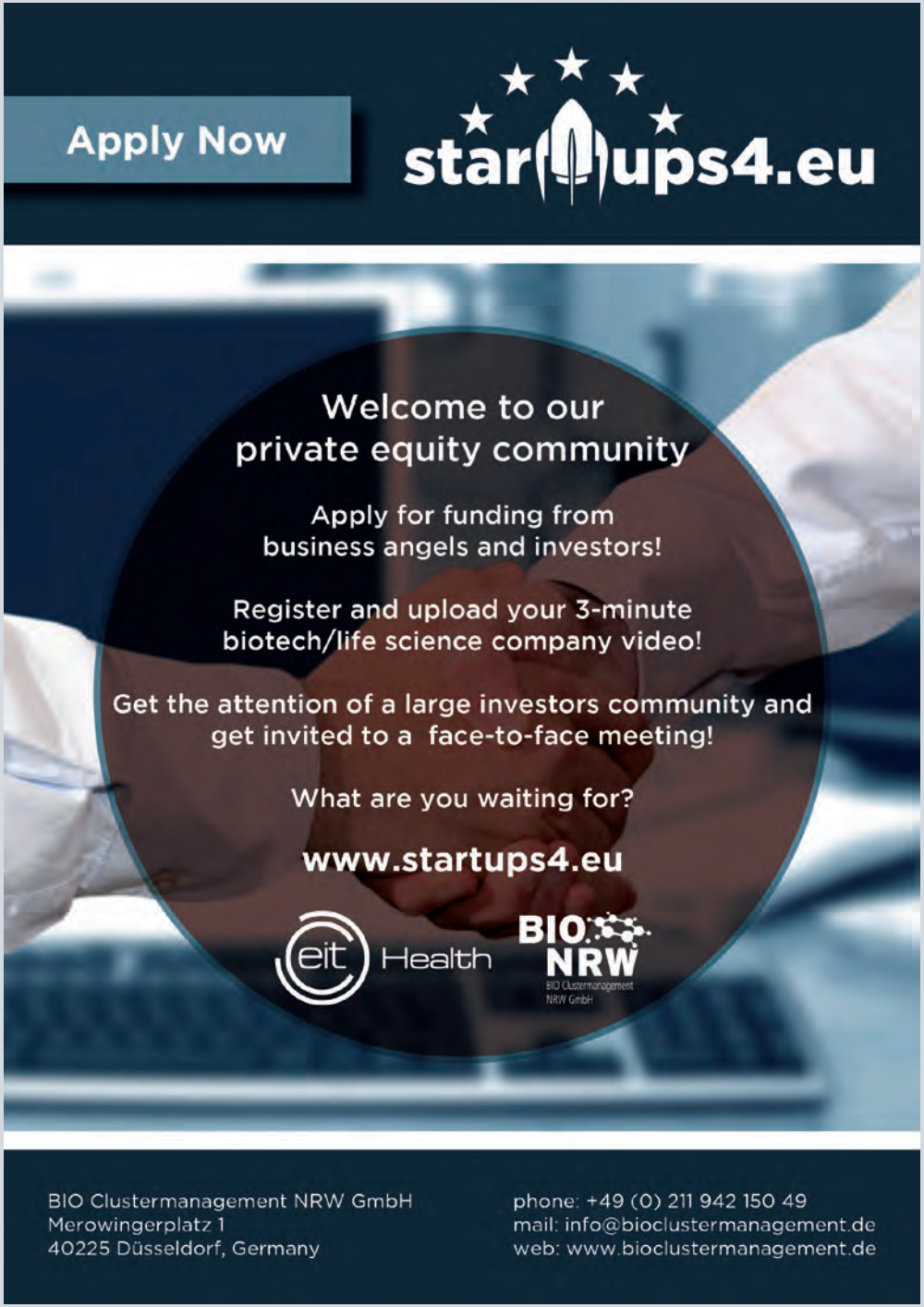
Equity is also a way to recruit an experienced entrepreneur, senior advisor, or consultant with unique expertise to your company.

8. Get VC funding or private equity

Financing is probably the greatest risk companies face in their early stages. A common feature of successful biotech's has been their financing strategies and the investment from VCs. The earlier you can get VC backing or private equity from business angels, the greater your chances of success.

Bringing in VCs or private equity from experiencend investors gives you access not only to cash but also to advice, information, market knowledge and networks. The investors can help you build the company, make it more financially attractive to other potential investors and increase the chances of your company going public. Essentially, the VC acts as a founding partner and gives you a solid financial platform from which to build your company.

Research your investors before meeting with them. Find out what their investment interests are and in which space they usually participate. This will help you tell your story appropriately, in terms of specific amount to ask for and your use of the funds.



How to overcome the challenges of financing a life science company

Life science companies will usually burn through millions of dollars over several years before generating any revenue. The great challenge for these companies will be procuring and managing the capital that will keep the biotech afloat, while its products go through the intense development and regulatory process.

The very key for success for young life science entrepreneurs of today is the access to capital and unfortunately the shortage of capital is a very common problem all over Europe. So what can you do to get funding? There are both business angels and venture capital funds that are specialised within the life sciences. European venture capital funds and business angels mostly invest in the medical technology and the Bio-IT field. If you are an entrepreneur within the drug development field, it might be a possibility to ask the major players within the drug development industry (i. e. corporate venture) for support and funding.

Build a consortium of investors

Because of the scarcity of capital and the high capital requirements for investments in the life science industry, it is imperative to look for a consortium of investors for the company, preferably already in the seed round.

"My advice to entrepreneurs is to plan ahead early, already in the seed round you should try to locate and interest investors for follow-up rounds", says Dr. Rainer Christine, founder of Amaxa and partner at Earlybird Venture Capital. Seed capital is still relatively easy to get, the challenges often begin in the A-round, when more money is needed.

What are investors looking for?

Keep in mind that investors are looking for a good return on investment and most of them are going through hundreds of business plans every year. There are several different kind of criteria investors are looking for when looking for to decide on the ultimate investment. Which of these criteria they find important varies from investor to investor. Some investors place more weight on investing in a strong business („the horse") than on a strong management team („the jockey"), others put more weight on the business idea or the technology. Both are of course important and the stronger you can present your company, the greater is the likelihood to get funding. Every firm, and every partner in every firm, is different – but there are some general criteria that most investors are looking for in a start-up:

- A strong management team with a successful track record.
- A patented technology with high entry barriers.
- A potential large market with potential to change status quo, a disruptive product
- A good chemistry between investor and founders and management.
- A willingness from the founders to share decision making with members of management, investors and advisory board – and still keep their own focus and engagement.

To finance successfully

To find good members of the management team, to share the decision making with investors, and to develop the company in a successful direction, is no easy task for a founder and entrepreneur. To finance the life science business successfully, it is important that all investors work closely and that they understand that the life science industry works fundamentally different compared to other industries.

"There is seldom a matter of choice when it comes to investors, most entrepreneurs of today are happy for every investor they can come up with. But if there is a choice, I would advise companies to rely on Business Angels which combine industry- and business experience. Also, there should be a willingness to engage with a certain time-commitment to the company ", says Dr. Rainer Christine, founder of Amaxa and partner at Earlybird Venture Capital.

Top class incubators and technology centers

With the densest research landscape in Europe combined with Germanys most powerful industry, North Rhine-Westphalia is a world-class location for science, innovation and entrepreneurship. With its many incubators and technology centers including 72 universities, two elite universities, ten clusters of excellence and five graduate schools NRWs support to technology transfer, from "mind to market", is at an international top level. Whether at the elite universities RWTH Aachen and University of Cologne, Research Center Jülich or the Fraunhofer and Max Planck Institutes – every day, many thousands of scientists and developers advance their know-how in their scientific fields a little more.

Many of today's successful young biotech companies started as university spin-offs and took advantage of the approximately 60 life science centers and incubators in NRW. These centers provides an efficient infrastructure for translating scientific expertise into marketable products and processes.

The incubators and technology parks in NRW are usually directly adjacent to research facilities and are providing services such as affordable laboratory and office space, networking opportunities and coaching regarding business development, patenting as well as funding opportunities.

The Cologne region.

The Cologne region, with its main cities, Cologne, Duesseldorf and Bonn, is situated in the heart of North Rhine-Westphalia. Characterized by a powerful industry within biotechnology, chemicals, pharmaceuticals, automotive/mechanical engineering, finance and insurance, trade, IT/telecommunications, logistics and media, the region is an international top location for business and entrepreneurship.

With eleven universities of applied sciences, numerous research facilities of the various Max Planck and Fraunhofer Institutes and the German Aerospace Center DLR as well as several other institutions, technology centers and incubators, the Cologne region has an excellent infrastructure for science, innovation, growth and entrepreneurship.

For over a decade, NRW has been leading the German region in stem cell research and development. In the field of plant genetics, the Max-Planck-Institute for Plant Breeding Research, Cologne deserves to be called the "cradle of plant biotechnology" in Germany, as the first plant transformation technologies were developed here.

The Bio Campus Cologne – The future starts here

As one of Germany's largest life sciences parks, BioCampus Cologne has become an important driver of innovation. The campus hosts numerous dynamic companies from the entire span of the life sciences sector and is offering more than 30,000 m² of clean room, laboratory and office space. The whole site is totalling more than 25 hectares and offers ideal opportunities for business expansion.

The comprehensive infrastructure and individual solutions for setting up new businesses, combined with the opportunity to work together with competent partners and experienced specialists, provide new perspectives and opportunities for entrepreneurs within life sciences.

BioCampus Cologne offers an interdisciplinary, synergetic environment of different technology fields like biotech, medtech, healthcare, IT, micro/nano technologies.

"At our technology park experts from various technology fields find ideal conditions to create, form and build on their business", emphasizes Andre van Hall, director & member of the management board at Bio Campus Cologne.

Besides corporates like Bayer, Lonza, or Sanofi, hidden champions like Ayoxxa, Axiogenesis, Direvo, or Sividon use the opportunities of BioCampus Cologne for comprehensive networking. In addition, young companies find their home in appropriate multi-user areas with direct access to other tenants of the campus.

"Especially startups are able to establish a network with mentors, potential clients and cooperation partners to enable a forceful launch of their business" says Ute Berg, managing director of the BioCampus Cologne and Deputy Mayor of the City of Cologne for Economic Development and Real Property.

- Over 30,000 m² of clean room, laboratory and office space.
- More than 25 hectares of area for business expansion.
- Respresentative event location with roof top garden.

www.biocampuscologne.de

The Technology Park Bergisch Gladbach

Synergies ensure success

For companies that want to establish themselves in the economic area of Cologne, this is the ideal location. Technology Park Bergisch Gladbach has many benefits, on the one hand, the location is relatively central with excellent transport connections, on the other hand the location is cost-effective compared to the big city. The Technology Park Bergisch Gladbach hosts both large global companies as well as medium-sized businesses. More than 140 companies thrive within an area of 75,000 m², including laboratory space.

- Area of 75,000 m² including laboratory space
- More than 140 companies
- Excellent transport and communications
- Close to Cologne

www.tbg.de

The Rechtsrheinisches Technologie- und Gründerzentrum, RTZ

The RTZ is located in the center of Cologne. With 1000 m² of office space including professional laboratory space, this is one of Germany's leading incubators and technology centers. During the last 13 years. the RTZ successfully supported about 170 start-up companies.

- 1,000 m² office space.
- Professional laboratory space

www.rtz.de

Lower Rhine

The Lower Rhine region is situated in the far west of North Rhine-Westphalia between the Rhine and the Netherlands. This is the home of the chemical industry, with chemical products accounting for one third of all industrial revenues in the region. Other important industries of the Lower Rhine area are the food industry/agro-business, modern textile industry, energy production, electrical engineering, mechanical engineering, wholesalers, B2B service providers, logistics and tourism. The optimal infrastructure is highly valued by international companies and global players such as 3M, Canon, Daihatsu, Hitachi High Technologies and Hitachi Power Tool, Toyo Tire and Toshiba. Three universities of applied sciences, technology centers and scientific institutes provide entrepreneurs with an outstanding infrastructure for innovation, research and development.

Bergisch Triangle

The cities of Solingen, Remscheid and Wuppertal form the economic region Bergisch Triangle. Located in central North Rhine-Westphalia between the Rhine and the Ruhr, its regional economy is characterized by automotive, electrical engineering, metal industry, surface technology and galvanization. Erfurt Raufasertapete, Solinger Klingen, Vorwerk and Zwilling are just some of the well-known names from the region. Besides the University of Wuppertal, education and research are concentrated to the Wuppertal Institute for Climate, Environment and Energy and at the Technical Academy Wuppertal.

Bayer Pharmaceutical and Chemical park in Wuppertal

The concept of the Bayer Pharmaceutical and Chemical park in Wuppertal has been implemented with great success. For small and highly specialized pharmaceutical productions, the Bayer Pharmaceutical and Chemical park is just as suitable for biotechnological development as for manufacturing. For chemical, pharmaceutical or biotechnology companies, as well as for analytics companies or manufacturers of laboratory equipment, the infrastructure is excellent.

- Contract development and manufacturing of biotechnological and chemical pharmaceuticals
- GMP competence
- Energy supply, output and auxiliary materials
- Construction, installation, maintenance and operation of installations
- Engineering Services
- Logistics services
- Plant Security

www.wuppertal.bayer.de

South Westphalia

South Westphalia is characterized by medium-sized industrial often family-owned enterprises within healthcare, lighting technology, metal processing, plastic processing, electrical engineering, mechanical engineering, recycling, sanitary installations, and the timber industry.

The region is a leading location for many, often unknown to the public, automotive suppliers, yet they are European and often worldwide market leaders. The industrial core competences also shape and influence the key research areas of the regional university landscape such as the University of Siegen and the South Westphalia University of Applied Sciences.

Aachen

The Aachen Region is situated in the south-west of North Rhine-Westphalia at the border tripoint with Belgium and the Netherlands. Within a radius of 500 km, two thirds of the population of Western Europe can be reached. Innovative industries within life sciences, modern materials and production technology, automotive and rail technology, as well as information and communications technology, are shaping the business landscape. This has already convinced leading global companies such as Denso Automotive, Ericsson, Ford, Microsoft and Saint-Gobain Sekurit to settle in the Aachen region.

With the internationally reknown RWTH Aachen University and Jülich Research Center, the Aachen University of Applied Sciences, several Fraunhofer Institutes and numerous other research facilities such as the Technology Park Herzogenrath, The ITS Baesweiler International Technology- and Service-Center and the Aachen University of Applied Sciences, the Aachen Region distinguishes itself as an excellent and outstanding technology and science location.

Jülich Technology Center, TZJ

"Who relies on our experience can make a lot, even quantum leaps!"

Jülich Research Center employs more than 5,700 members of staff and works within the framework of the disciplines physics,chemistry, biology, medicine and engineering on the basic principles and applications in the areas of health, information, environment and energy. Amongst the members of staff, there are approx. 1500 scientists including 400 PhD students and 130 diploma students.

For entrepreneurs there are 12,000 m² laboratory and office space area. The TZJ is the ideal location for entrepreneurs. Service for launching and preparing a company for taking its initial steps and to keep the right course during the start-up phases is being offered.

- Offices space: from 16 m² to 60 m², 120 m², 180 m², 240 m²
- Laboratory space: space 120 m² and 240 m²
- Workshop space: from 67 m² with an affiliated office of 35 m²

www.tz-juelich.de

The Technology Park Herzogenrath, TPH

Launch – Grow – Invest

As one of Europe's largest technology parks, the Technology Park Herzogenrath is offering an attractive concept with networking opportunities for founders and entrepreneurs. Flexible and cost effective leasing space is one of the key features of the Technology Park Herzogenrath. Appealing in both its architectural and functional design, the Technology Park Herzogenrath offers:

- Cost effective solutions.
- Flexible, easily connected areas and rental space up to 1,200 m². Areas not directly next to each other can be connected electronically.
- Adjustments for individual needs can be cost effectively arranged.
- Special space- and service offers available through CO:-FORWARD, an initiative for technology or digitally based start-ups.

www.tph.de

The Technology Center Aachen (TZA)

The Technology Center Aachen (TZA) offers excellent conditions for technology-oriented start-ups. International investors and companies consider the center an ideal start position into the European market.

- A total of 14,250 m² office rental space, meeting the requirements of technology-based businesses
- Light and modern standardised office units as of 36 m² (14 m² + 22 m²) can be rented and returned at short notice
- Larger lockable office units from 70–150 m² that are ideal for expanding technology enterprises

www.agit.de

The Center for Biomedical Technology (ZBMT) …

… in Aachen is located in the center of the Aachen Bio-Medical Engineering Cluster, an aspiring project in the Aachen region. The building offers premium office and laboratory areas on a total area of around 4,100 m², separated on four floors. On the one hand the ZBMT offers furnished workspaces, on the other hand its location offers the advantage and possibility to get in touch with nearby research facilities like the University Hospital RWTH Aachen or the Helmholtz Institute for Biomedical Engineering.

- Office and laboratory space on a total area of around 4,100 m²
- Networking opportunities with University Hospital RWTH Aachen or the Helmholtz Institute for Biomedical Engineering

www.agit.de/en/technology-centres-aachen/zbmt-center-for-biomedical-engineering.html

The ITS Baesweiler

The ITS Baesweiler is located in the center of the industrial park Baesweiler. At an industrial area of 16,000 m² ITS offers flexible production and laboratory space that can be personalized with a high degree of functionality. About 40 companies make use of the facilities and services and more than 170 other companies are located in the industrial park Baesweiler.

As a technology and business park the ITS offer favourable leasing conditions as well as extensive professional services. The aim is to support the companies to establish their own business premises in the Aachen region or in the Industrial Park Baesweiler (next to the incubator center). The laboratory facilities possess – among other features – a special sewage treatment unit (neutralization unit), acid-resistant floors and ventilation systems.

- 6,500 m² flexible and customized production and l aboratory space
- Integrated support system
- Favourable leasing conditions
- Extensive professional services
- Separate walk-delivery options relating to the production halls
- Acid-resistant floors and air ventilation in the laboratory space
- Representative conference rooms with comprehensive, high-tech equipment
- High speed internet access via optical fibre

www.its-center.de

The Ruhr Metropolis

The Ruhr Metropolis, after Paris and London the third-largest metropolitan region within the EU, is the industrial center of North Rhine-Westphalia and is characterized by an excellent economic and scientific infrastructure.

Research, development and production are closely interlinked in a complex network of expertise in healthcare, chemicals, energy and logistics. Five universities, including the Ruhr University Bochum, 15 universities of applied sciences, three Max Planck Institutes, four Fraunhofer Institutes, four Leibnitz Institutes as well as some 30 non-university research facilities ensure world class research, technology transfer and qualified young employees.

The Healthcare Campus North Rhine-Westphalia in Bochum contributes to the further advancement of the region as a healthcare and life science location. Other powerful incubators and technology centers in the Ruhr metropolis is the Bio Medizin Zentrum Dortmund, BioMedizinZentrum Bochum, Competence Center Bio-Security (Boenen), ZBZ Dental-bioscience research and development Center Witten GmbH, Life Science Center Düsseldorf and The Technology Center Ruhr. The Ruhr Metropolis is also home to the corporate headquarters of many of the top-grossing companies in Germany such as Aldi, Evonik Industries, Haniel, Hochtief, Klöckner, RWE, Tengelmann, and ThyssenKrupp.

The Competence Center Bio-Security

The Competence Center Bio-Security in Boenen, entrepreneurs within the agro-food industry, biotechnology and related industries are being offered a complete solution in tools and services for developing their entire business concept. The Competence Center Bio-Security provides fully equipped laboratories (S1/S2 and clean rooms), offices, workshops and storage areas for rent, additionally they are providing clients with start-up consulting, funding advice and project consulting as an integrated full service concept.

"This is the ideal environment for the development of new business concepts within life science", says Dr. Oliver Bonkamp, procurator at the Bio-Security Management GmbH.

www.bio-security.de

The Witten Centre of Dental and Life Science Research (ZBZ)

The ZBZ provides founders, companies and scientific institutions from the life sciences and dental field with an infrastructure of laboratories, experimental, office and multifunctional areas and treatment rooms, including the necessary equipment and facility management. Meeting and lecture rooms can be flexibly rented for up to 40 people. This concept permits applied research and development in co-operation with a renowned university as a partner for clinical studies, applications and innovations under one roof. Close links between the dental clinic of Witten/Herdecke University and the university's affiliated hospitals and partner surgeries provide access to a large pool of patients for research and teaching as well as further and continuing education.

- Office space is for rent at Euro 11.15/m²
- Laboratories for Euro 13.65/m² plus utility costs
- Rooms may be rented at the ZBZ for events with up to 40 participants
- A total office- and laboratory area of 3,400 m²

www.zbz-witten.de

The Bio Medicine Center Dortmund, BMZ

At an area of 15,000 m² the BMZ provides young companies and start-ups with an attractive infrastructure and high quality consulting for operating within the fields of biomedicine, proteomics and bio-IT. The BMZ offers bio-labs up to S2 standard, complete facilities, service and equipment, making it possible to start straight away with the operational lab work.

- Fully equipped laboratories for gene technical research (up to S2 standards)
- Ideal environment for biomedicine, proteomics and specialist IT
- Central media supply, different fume hoods, weighing tables, gas bottle lockers etc.
- Seminar and meeting rooms
- Area of 15,000 m²

www.bmz-do.de

BioMedicineCentre Bochum

Situated on the campus of the Ruhr-University Bochum, the BioMedicineCentre Bochum (BMZ) provides young entrepreneurs within Life Science and Health management with 5,200 m² office- and laboratory space to be used for the development, production, and market launch of new products, technologies and services. The activities of the BMZ are especially focused on the translation of research findings delivered from the university, surrounding clinics, and medical schools into marketable products or technologies.

- 5,200 m² office- and laboratory space
- Laboratories with higher safety standards
- Standard laboratory devices (S1-Standard)
- Floor areas ranging from 15 to 50 m²

www.bmz-bochum.de

BioIndustry

– Partner for Life Science founders in Westphalia

BioMedicineCentre Dortmund www.bmz-do.de

The BioIndustry e.V. is the active Life Science Network in the heart of Westphalia. In its affiliated technology centers Bochum, Bönen, Dortmund and Witten fully equipped laboratories and cleanroom surfaces are provided for innovative Life Science founders.

In addition to the area capacity an all-round carefree package is offered.

This package includes not only technology consulting but comprehensive management consulting and advisory by our network of professional partners.

The contact persons BioIndustry and the centres will act as one stop agency and will coordinate the necessary support.

BioMedicineCentre Bochum www.bmz-bochum.de

Centre of Dental and Life Science Research Witten www.zbz-witten.de

Competence Centre Bio-Security Bönen www.bio-security.de

In BioIndustry e.V. your ideas become innovations!

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Düsseldorf

The Düsseldorf Region embraces the city of Düsseldorf and the economic importance of the region is being reflected in the presence of global companies such as E.ON, Henkel, McKinsey, Mitsubishi, Metro and Vodafone. The biotechnology and genetic engineering industry is represented through companies such as Qiagen, Artes Biotechnology and Bayer CropScience. Together with numerous research institutes such as the Max Planck Institute for Iron Research, the Heinrich Heine University and the Düsseldorf University of Applied Sciences, they form an ideal structure for innovation and entrepreneurship in the Düsseldorf region.

Life Science Center Düsseldorf

Life Science Center Düsseldorf is a modern technology center and business incubator which offers an ideal environment for the development of ideas within life science. Together with DIWA GmbH (Düsseldorfer Innovations- und Wissenschaftsagentur), CEDUS (Center for Entrepreneurship Düsseldorf), Heinrich Heine University, the City of Düsseldorf, LifeScienceNet Düsseldorf and other partners, Life Science Center Düsseldorf help start-ups and young entrepreneurs as well as already established firms to turn their know-how into marketable products and processes. With a network of experts from the field of finance, research, development and technology transfer and with offices and laboratory facilities right next to the Heinrich Heine University Düsseldorf, the Düsseldorf University Hospital and the Düsseldorf University of Applied Sciences, this is the ideal location for entrepreneurs within the life sciences.

- Flexible laboratory and office space for individual requirements
- Areas from 36 m² per rented room and upwards, including all necessary technical connections

www.lsc-dus.de

Creative Campus Monheim

Creative Campus Monheim is home to a successful mix of pharmaceutical companies, biotech start-ups, media agencies and consultants as well as to marketing application, marketing and distribution services. The Campus provides highly qualified people and companies with offices and laboratories for activities within the life sciences. Excellent infrastructure including numerous services such as kindergarten, bistro and café, dry-cleaner, bank and sufficient parking lots, makes the campus stand out. The location of Campus Monheim, in between the cities of Cologne and Düsseldorf, with direct access to the motorway, two international airports and two ICE-main stations, is ideal for all kind of companies within the life science industry.

www.cc-monheim.de

East Westphalia Lippe

The region of East Westphalia Lippe, situated in the north-east of North Rhine-Westphalia, is a economic region, characterized by small and medium-sized enterprises, many of which are family-operated. Under the brand „it's OWL – Intelligent Technical Systems Ost Westfalen Lippe", industry and research are working on the quantum leap from mechatronics to inherent intelligence. Since January 2012, „it's OWL" has been a designated "leading-edge cluster" in the federal government's high-tech strategy. The universities in Bielefeld and Paderborn, as well as eight other universities ensure diversity in the education landscape. With a gross domestic product of around 60 billion euros per year East Westphalia Lippe is one of the fastest growing economic regions in Germany and one of the leading technology locations in Europe.

The Technology Center Bielefeld

Since 1995, the Technology Center Bielefeld offers excellent starting conditions for entrepreneurs and young companies. Cost effective office and laboratory space with excellent infrastructure provide a good framework for successful start-ups. In addition to start-ups and existing technology companies to benefit from the creative potential of the center. **www.wege-bielefeld.de**

The Muensterland

The Muensterland in the north-west of North Rhine-Westphalia is one of Germany's top locations in the field of new materials. Besides outstanding scientific research institutes, the region is also home to several major industrial sectors, some of which have a long tradition, producing and processing materials such as textiles, plastics, wood, metal, dyes and lacquers, used in numerous industries. With the University of Muenster, the universities of applied sciences, the MEET battery research center, the Max Planck Institute for Molecular Biomedicine and the Center for Nanotechnology (Cantic), the capacity for innovation and networking in Muenster land is at an international top level.

The Muenster's Center for Biotechnology (BioZ)

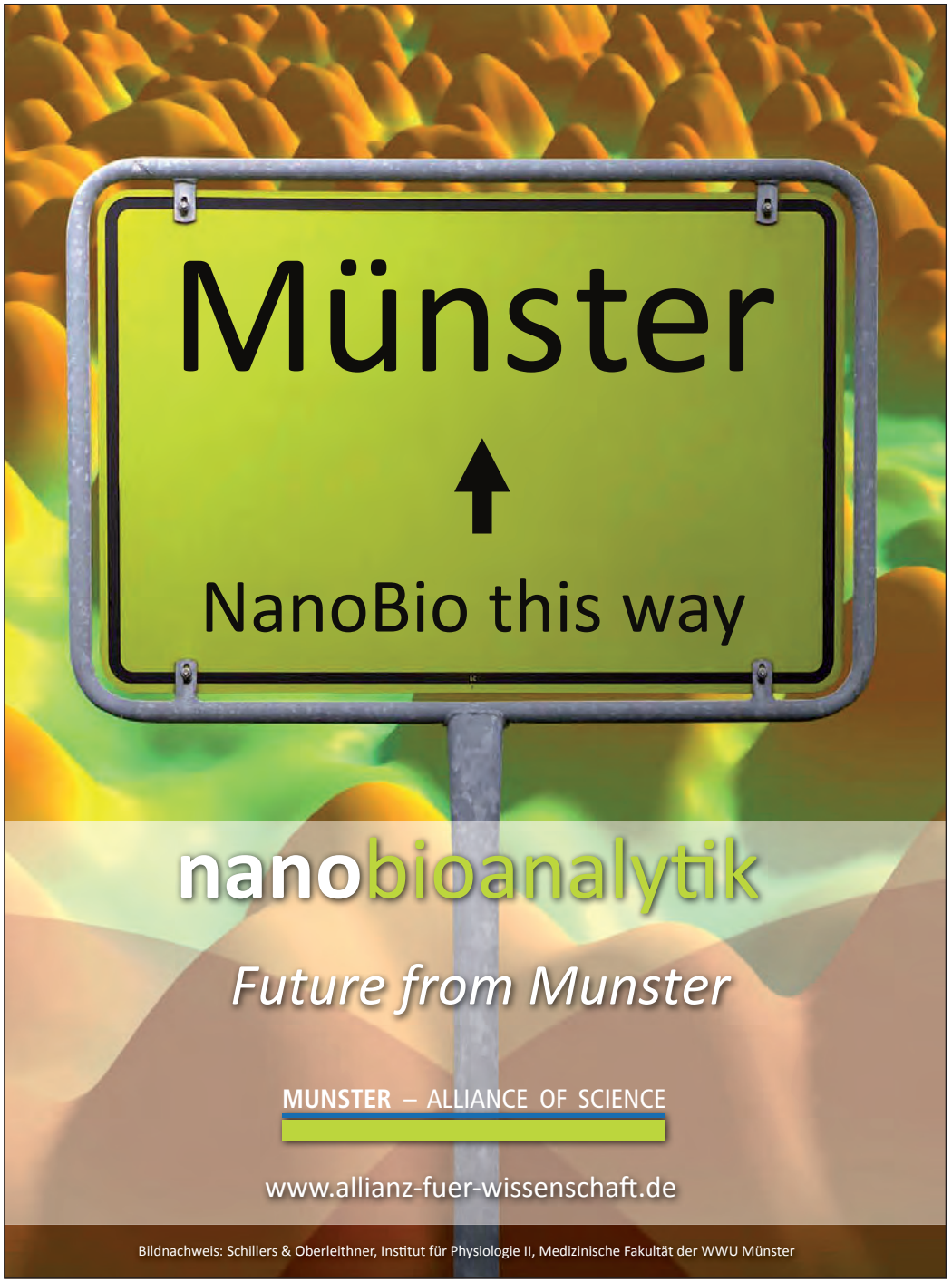
The Muenster's Center for Biotechnology (BioZ) is located at the Muenster Technology Park and is designed to meet the needs of biotech companies. A total area measuring 2,400 m^2 houses special laboratories and a number of additional facilities for rent.

www.technologiefoerderung-muenster.de

Center for Nanotechnology (CeNTech)

At the Center for Nanotechnology (CeNTech) infrastructure is provided for interdisciplinary collaborations involving faculties of the University of Muenster (chemistry, physics, biology and medicine). Research and development at CeNTech focuses on the Nano scale analysis, keeps a strong relation to technological applications and shall result in patents for new nanotechnology based inventions, which can be developed up to the product level. The building has 2,400 m^2 of laboratory and office space and offers an ideal environment for Nano technological research.

www.centech.de



To see and to be seen – at the largest trade fair venues in the world

Trade fairs are an excellent way to be seen and to discover new opportunities. They are also very important for the transfer of technology to market. With over 100 leading international trade fairs, attracting about six million visitors each year and an indoor exhibition area of as much as 716,000 square meters, NRW is not only the largest exhibition area in Germany, but worldwide – compared to Hannover, Frankfurt am Main, Milan, Guangzhou (China), Chicago, Valencia and Paris.

For entrepreneurs within the life sciences, there are many trade fairs and events to take advantage of in NRW, as well as internationally. BIO.NRW offers shared booth space together with a supporting program at the international leading trade fairs BIO-Europe, BIO-Europe Spring and BIO International Convention USA. The fairs in NRW reflect the global market conditions and serve as an important marketing tool for entrepreneurs from around the world. The outstanding infrastructure and the central location of NRW ensure optimum accessibility of all trade fair cities, and that the highlights are transferred from here to the world market.

BIO-Europe® Conference

BIO-Europe® is Europe 's largest annual partnering conference serving the global biotechnology industry. This three-day event rotates between major European cities and this year 2016, for the second time, Cologne in North Rhine-Westphalia will be hosting the BIO-Europe® conference. Delegates from all parts of the biotechnology value chain come to BIO-Europe® to identify, engage and enter into strategic relationships, to drive their businesses successfully forward.

As Europe 's largest partnering conference, the number of one-to-one partnering events at BIO-Europe®, are growing steadily every year. This year, as many as 20 000 partnering events will be taking place at the BIO-Europe® conference.

The BIO-Europe® annual event attracts as many as 3,800 industry attendees from 60 countries, representing more than 1,800 companies for three days of high level networking.

"BIO-Europe® is regarded as a "must attend" event for the global biotech industry- this is the place to be, no matter if you are an entrepreneur, an investor or a service provider. Here at BIO-Europe® the entire life science industry of the world nearly gathers and because of that that, there is actually no need to go anywhere else! We try to make this a truly magnificent event so that it becomes as successful and productive as possible for our participants", says Karin Dierkes, Senior Director of Business Development and Operations of the EBD Group AG.

BIO-Europe Spring®

Where the global biotech industry comes to partner

BIO-Europe Spring® is the sister conference to BIO-Europe® and the premier springtime partnering conference in Europe, which annually attracts an international „who's who" from biotech, pharma and finance for three days of high calibre networking. The event is, just like the BIO-Europe® event, rotating between the major European biotech cities.

BIO International Convention, USA

The BIO International Convention is the largest global event for the biotechnology industry and is rotating between the most important biotech centers in the USA. The event offers key networking and partnering opportunities, and provides insights and inspiration on the major trends affecting the industry. Over 15 000 biotechnology and pharma leaders come together for one week of intensive networking to discover new opportunities and promising partnerships. The convention covers a wide spectrum of life science and application areas including drug discovery, biomanufacturing, genomics, biofuels, nanotechnology and cell therapy.

The J.P. Morgan Annual Healthcare Conference

The J.P. Morgan Annual Healthcare Conference is an annual conference for healthcare companies, held every January in San Francisco, CA, USA. The conference is widely known as the largest and most informative healthcare symposium for investors and the financial industry. The conference, hosted for J.P. Morgan clients, is an invitation-only conference and welcomes corporates, start-ups, non-profits, and investors from around the world. The biggest health care investing event of the year, discussing the hottest topics in the global healthcare sector.

Biotech Showcase™ an annual event in San Francisco, USA

Biotech Showcase is an annual investor and partnering conference for private, small- and mid-cap biotech companies taking place in January in San Francisco, CA, USA. The event is devoted to provide private and public biotechnology and life sciences companies with an opportunity to present to, and meet with, investors and potential strategics in one place, during the course of one of the industry's largest annual healthcare investor conferences, the J.P. Morgan Annual Healthcare Conference.

For entrepreneurs within Industrial Biotechnology Industry there are many important events in North Rhine-Westphalia, as well as around the world.

International Conference on Bio-based Materials, Cologne, Germany

At the International Biomaterials Conference leading companies and scientists in the bio-based economy are presenting the latest developments, strategies and innovations within the bio-material industry. The Conference on Bio-based Materials builds on successful previous conferences and 250 participants and 30 exhibitors mainly from industry are expected. The Innovation Award "Bio-based Material of the Year" will be granted to innovative bio-based chemicals and materials entrepreneurs.

Bio-based Start-up Day, Cologne, Germany

The Bio-based Start Up Day is a new meeting place for start-ups, industry representatives and investors. The event provides excellent networking opportunities for newcomers and professionals from the fields of biotechnology, bio-based chemicals and plastics and is being supported by the Biotechnology Cluster CLIB2021 and the IBB network.

The annual EFIB Conference

"The European Forum for Industrial Biotechnology and the Bioeconomy". The EFIB Conference is an annual event in Europe for Industrial Biotechnology and the Bioeconomy. The conference is organised by EuropaBio, Europe's largest biotechnology industry group and is rotating between Europe´s major cities. Every year around 700 attendees network side by side with global biotechnology leaders and representatives from global consumer product companies, industrial biotech visionaries, expert speakers and early adopters of bio based technologies.

World Congress on Industrial Biotechnology

The BIO World Congress on Industrial Biotechnology is an annual event and every year another city or biotech hotspot is hosting the event. This is the largest industrial biotechnology event for industry leaders, investors, policy makers and academics in biofuels, bio based products and renewable chemicals in the world.

The CLIB International Conference

"Bio economy – next steps into value creation."
A two-day conference covering biotechnological processes and renewable resources. Low oil prices are putting pressure on alternative feedstocks and novel processes, and have made cost-efficiency of processes and access to molecules with unique properties crucial. The conference will highlight the most recent developments within the bio economy, such as the development of bio catalysts, the bioprocess development and bio based solutions for the cosmetic industry.

Follow this code for further information

Why biotech consulting?

Consulting firms with a special focus on biotechnology help companies to create the foundations for future growth and improve the effectiveness and efficiency of their current business operations.

A biotech consultant can help entrepreneurs to become the future market leaders by focusing on the priorities that will make them agile and adaptable to attractive market opportunities. A consultant can support a life science entrepreneur in many areas such as:

- How to write an investment-grade business plan?
- How to attract investors and secure funding?
- How to select advisory board members?
- How to create a financial model?
- How to incorporate a business?
- How to protect the concept?
- When and how to file patents?
- How to find management and employees?

Time to focus on the right things

The benefits of getting advice from a biotech consultant are numerous. It can for instance reduce the overall cost and overhead for company startup, improve the relationship with investors, protect the intellectual property, maximize the competitive advantage, attract top-calibre executives and employees and perhaps most important: startup founders get time to focus on product development and recruiting.

"My advice to young biotech entrepreneurs is to do the things you are procrastinating most first, research shows that actions you tend to postpone, often matters very much. We notice in our job that life science entrepreneurs sometimes are reluctant to do things they are not used to do, often they prefer to re-enter the lab to develop their technology another step, rather than give their patent attorney a call, to sign up for that investor pitch presentation course or to enrol in that business plan competition. But that action just might be the single most important step towards success. Even more important than reaching another milestone in the product development. As consultants, we can help set priorities straight," says Dr. Holger Bengs, CEO and managing partner at BCNP Consultants GmbH.

DWF, the business law firm that goes further

DWF is the legal business where expertise, industry knowledge and leading-edge technology converge to deliver solutions that enable our clients to excel.

Embracing our diverse skills, we gain a unique and more valuable legal perspective that can empower our clients, giving them a competitive advantage or simply delivering new solutions to old problems.

For information about how DWF can assist clients in the startup and Biotech sector, please contact Klaus Brisch using the details below.

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Exit strategies for biotech companies

There are several different exit strategies for biotechnology companies of today. The US-style financing strategy which involves letting ideas mature with the support of venture capital and then making financial returns when the company goes public only works in exceptional cases in Germany. Although such an IPO may be the most glamorous form of exit it is not the most common.

Most companies are sold through a merger or acquisition event before an IPO can take place. If the portfolio company is bought out or merges with another company, the VC receives stock or cash from the event. Another alternative may be the reorganization of a portfolio company's debt and equity mixture, called a recapitalization. The VC exchanges its equity for cash, the management team gains equity incentives, and the company is positioned for future growth.

Strategic investors

Other exit strategies are the licensing of products/services or the sale of companies to strategic investors, notably pharmaceutical companies or mature biotechnology companies. Pharmaceutical companies are also becoming increasingly interested in early-stage projects. This is due to the intensive competition for promising innovations. Pharmaceutical companies are hugely interested in anything that adds to their value creation chain and gives them a market advantage, whether this is know-how, a technology or a product.

Why should company investors and founders discuss an exit strategy?

Entrepreneurs need capital, but to attract investors into their business, they have to provide investors with attractive exit options. Investors need exits because they need to raise funds and the funds are raised on the basis of a good track record of exits.

Understanding the lifecycle of the fund

European investors historically have had different time lines for exits compared to entrepreneurs. Investors have a certain time frame and by talking to your investors, you can understand the lifecycle of their fund and the time frame they have in which to exit.

"I think it's critical that companies discuss exits with their investors as early as possible, to avoid surprises at a later stage. Entrepreneurs, founders and investors all need to be on the same page about the exit strategy," says one of Germanys leading biotech entrepreneurs Dr. Jürgen Schumacher, cofounder of Qiagen, NewLab, current CEO Algiax and a successfully investing business angel.

That one little thing

On the way to market access reimbursement is one legal issue that must not be forgotten

Of course, biotechnology is a highly regulated field. Of course, you need to look out for tons of legal rules before taking steps into genetic diagnostics, setting up a clinical study, producing a really innovative product. Of course, you know that. But: if the idea behind the project is good, clinical results have been validated and the process of achieving a marketing authorization has been successful, another question arises: How can we sell and who's going to buy it? What exactly is the market?

The legal framework for biotechnology products is dense and complicated, split into national and European laws, sublegal by-laws, ministerial decrees and guidelines. Scientists and entrepreneurs, on many occasions, have the opportunity to gain routine with legal preconditions for the clinical research and how to achieve marketing authorization in this intricate environment. Some might even have experienced the cooperative spirit arising between the governing authorities and research focused companies, mutually aiming at the goal of creating products or therapies safe, efficacious and produced in high quality. At the end of the day, however, return on investment needs to be achieved and on many occasions this will be the first time for the company's decision makers to get acquainted with the conditions of pricing and reimbursement.

Germany is by far one of the key markets for biotechnology products in Europe. It is known for high standards in clinical research and production. But it should not be underestimated that the obstacles for entering the market may be even higher. What are the necessary steps for a biotech product to be accepted by the biggest customer in Europe, the Statutory Healthcare Insurance in Germany (GKV)?

Evidently this will depend on the nature of the product. Biotechnology products can be pharmaceuticals, advanced therapy medicinal products (ATMP), medical devices or diagnostic procedures (be it in-vitro or in-vivo). Sometimes they may be so innovative that they cannot be qualified as any of the previous.

Biotechnological pharmaceuticals will most likely run through the routine cycles of clinical studies I to III striving for a marketing authorization in a centralized procedure at the European Medicine Agency, EMA, Federal Institute of Pharmaceuticals and Medicla Devices BfArm or possibly the Paul Ehrlich Institute, PEI. After marketing authorization the product may be listed in the German pharmacies' databank IfA and sold to wholesalers, pharmacies and hospitals. The price setting is at the discretion of the entrepreneur for the first 12 months. Thereafter the price negotiated with the umbrella association of the insurance funds (GKV-SV) will enter into force. The negotiation is based on a benefit assessment executed by the Joint Committee (GBA) on the basis of the dossier that the pharmaceutical company has mandatorily supplied at the day of market entry. More than 150 pharmaceuticals have undergone this procedure, some of these being biotechnological products.

Advanced therapies can be somatic cell therapies, genetic therapies or tissue engineered products. Their marketing authorization is achieved through the centralized procedure with the Committee of Advanced Therapies CAT at the EMA or, in Germany, as a hospital exemption. After achieving marketing authorization the reimbursement process for these products is depending on the nature of the product. If the product is just applied like a typical pharmaceutical it can be subject to prescription and reimbursement from day one of market entry as outlined above. If the product is part of a process or method that is new to the system it might require evaluation by GBA. The bad news is that the biotechnology company is not entitled to file an application for this evaluation. It is up to the discretion of the members of the GBA and other specified public bodies to initiate the process.

Overview Biotech Products and Applicable Law in Germany

	Clinical Research	Marketing Authorisation	Distribution	Assessement (responsible body)
Biological Medicinal Product	2001/20/EC 2005/28/EC §§ 40ff. AMG GCP-V	EMA BfArM PEI	§§ 31, 34 SGB V Prescription	§ 35a SGB V (GBA/IQWiG „AMNOG-procedure")
Advanced Therapy (Genetic therapy, tumor vaccines, tissue engineering)	2001/20/EC EC/ 1394/2007 § 4b AMG GCP-V	EMA PEI § 4b AMG	§§ 31, 34 SGB V Prescription and/or application NuB	§ 35a SGB V § 135 SGB V § 137c, e SGB V (GBA/IQWiG)
IV-Diagnostic Lab on a chip	98/79/EC GLP GenDG	Notified body CE-Mark	Physician or Hospital commission or buy and apply	§§ 87 (BA), 135 SGB V (GBA) § 6 KHEntgG (InEK)
Medical Devices as part of therapy	93/42/EEC §§ 19ff. MPG MPKPV	Notified body CE-Mark	Physician or Hospital buy and apply	§§ 135,137c, 137e,137h SGB V (GBA)
Medical Devices supplied to patients as medical aid ("Hilfsmittel")	93/42/EEC §§ 19ff. MPG MPKPV	Notified body CE-Mark	§ 33 SGB V Prescription and delivery	§ 139 SGB V (GKV-SV)

Other biotech products might fulfill the legal definition of a medical device and be subject to the certification process with a notified body. Even though reimbursement has not been much of a topic here, Germany is introducing benefit assessment for innovative medical devices with a highy invasive character and is assessing benefit and economics of other MD before listing them in the register of medical aids.

Finally some biotechnological products are diagnostic in nature and applied in laboratory settings. In these cases the diagnostic procedure itself might need assessment, positive evaluation and later enrollment in the list of diagnostic procedures for hospitals (i.e. InEK's NuB-Assessement) or physician's practices environment (i.e. EBM adaptation).
All of these procedures will have one thing in common: the product's acceptance, its enrollment in the list of services and the pricing will, with some variations concerning the type of product (see the table below), be based on the assessment of benefit and cost. For innovative pharmaceuticals this will be assessed with a comparator that can be the standard of care but is generally determined by the Joint Committee GBA. This comparative benefit assessment has not automatically been part of the development of the biotechnological product and the endpoints required for this benefit assessment are rarely found in the clinical study reports that have been written to achieve marketing authorization in the first place. Most clinical studies are powered to prove non-inferiority. Now, that will not be sufficient for the benefit assessment, which will apply Evidence based Medicine and focus on mortality, morbidity and quality of life. Another valid endpoint is reduction of adverse events. It is therefore essential for biotechnology companies to assess the nature of their product in terms of categories of the Statutory Health Insurance and its reimbursement channels.

It is advisable to include the aforementioned benefit endpoints into a clinical study before the study design has been finalized. It is advisable to design studies according to CONSORT criteria with sufficient power and sufficient time to generate results that can stand up to the scrutiny of evidence-based medicine. It is advisable to consult the Joint Committee GBA or other authorized bodies to reconcile research, marketing authorization and reimbursement goals.

Therefore, our recommendation is that biotechnology companies be aware of the highly regulated system Statutory Health Insurance, which will not uncritically welcome any innovation just for the sake of it being new and promising. It will (rightly so!) ask critical questions, demand validated endpoints and will not be overwhelmed by surrogate parameters when accepted endpoints can be achieved within reasonable time.

The amount of work and the challenges of this should not be underestimated. However, biotechnology companies that want to be smart movers in the market should integrate reimbursement planning into the initial stages of their product development. It's the one little but decisive thing that must not be forgotten.

Christian Dierks, Attorney for Medical Law,
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www.db-law.de

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