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Sector report 1.2008

Life Science

Life Science

in Mecklenburg-Vorpommern, Germany

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Mecklenburg Vorpommern
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Europäische Fonds EFRE, ESF und ELER
in Mecklenburg-Vorpommern

1. Introduction

“Science with Tradition“ – that is the abiding motto in Mecklenburg-Vorpommern! The two universities of Rostock and Greifswald are numbered among the oldest colleges in Europe. Furthermore, practice-oriented universities of applied sciences have been founded in Stralsund, Wismar and Neubrandenburg.
These institutions of scientific learning are complemented by a handsome number of high-grade research institutes and technology centres.

Around these university locations, many highly efficient small and medium sized companies have been established, which are occupied with the application of modern methods from the fields of Life Science.
The innovative strength of our state is more than a little attributable to the close relationship between the economy and the sciences. The innovation-friendly climate is attracting increasing numbers of young companies from the fields of Life Science, biotechnology and medical technology, which have created new workplaces with innovative products and procedures.

Until now Mecklenburg-Vorpommern has received limited recognition as an innovation-friendly, future-oriented state. The sector report „Life Science in Mecklenburg-Vorpommern“ is intended to provide information about the development of the Life Science sector in Mecklenburg-Vorpommern and to contribute to an improved communication on the subject of the innovative strength of the sector and its protagonists. The modern Life Sciences have a high degree of innovation potential which should in any event be effectively exploited. They can be helpful in providing answers on the subjects of, for example, nutrition and health; thus they display a basis for new, intelligent systems and products, for optimised methods and procedures. In short: technology for the future with which the location of Mecklenburg-Vorpommern can be strongly promoted.

In the enclosed first report, current data on the development and the structure of companies in the sector are presented. The report is intended to accompany the developments in the Life Science sector as a series of running commentaries comprising relevant information.

We wish you a pleasant read of this first edition of the sector report for “Life Science in Mecklenburg-Vorpommern“.

Your BioCon Valley® - Team

2. Structure of the Sector

It has hitherto not been possible to establish a uniform definition for the collective noun “Life Science“. In general, all sciences which are connected with life and its processes are combined under the expression. As a rule the German word „Lebenswissenschaften“ is used as a synonym.

Within the Life Sciences, biotechnology has taken on a pivotal role. With the increasingly interdisciplinary and cross-sector nature of co-operation, biotechnology is becoming more and more often connected with a range of other sectors such as medical technology or agriculture (the breeding of plants). The sector report takes these developments into account and is based on the assumption that the interaction will increase still further. Thus an image of several partial sectors develops on the basis of a broad definition of the life-science sector, which is briefly described here:

Biotechnology

For historical reasons, various definitions have developed on a parallel basis for the word “biotechnology”. Stemming from the classical subjects of biology and chemistry, the modern biotechnology uses, according to a broadly recognised definition of the OECD (Organization for Economic Cooperation and Development) all

”innovative methods, procedures and products which work with living organisms or their cellular components or are manufactured with the help of these materials.“

In the line of this work, the findings of research in the fields of biochemistry, molecular biology, immunology, virology, microbiology, cell biology or environmental and procedural technology are used. Gene technology is in part an area of biotechnology. Market segments are, for example: pharmaceuticals, vaccines, medicinal products, diagnostic products, plant breeding, renewable raw materials, and the manufacture of nutritional products, enzymes, fine chemicals, environmental biotechnology or analytical services.

In a more recent proposal for the subdivision of the biotechnology sector, the OECD additionally differentiates between biotechnologically active or dedicated companies and innovatively biotechnologically active companies.

The modern field of biotechnology is divided into various areas of technology, which differ according to market perception, the level of maturity and the growth prospects and have colour-associated fields of application:

- **Green Biotechnology**
  Is based on plant and food biotechnology.
- **Red Biotechnology**
  Developments and applications from the areas of human und veterinarian medical biotechnology and also pharmaceutical biotechnology.
- **Blue Biotechnology**
  Is occupied with the biotechnological aspects of marine organisms, mainly micro algae for the detection of new active ingredients for future medications.
- **White Biotechnology**
  Industrial manufacture with biotechnical procedures, environmentally protective production processes, environmental protection and restoration
- **Grey Biotechnology**
  Development and application of bioprocess engineering in industry and environmental protection.

Medical Technology

The application of engineering science principles and rules is very much to the forefront in the field of medicine in medical technology. The co-operation of doctors, engineers, IT specialists and naturalists in the development of medical technical equipment and systems opens ever more improved possibilities for diagnosis and therapy. Together with the USA and Japan, Germany holds a leading position in the world market of medical technology.

The expression “medical technology“ is relatively broadly composed and incorporates not only the development of equipment but also technically based rudiments (products and procedures), for use in medicine, insofar as these are regulated by the medical devices law:

“medical devices are all individually or combined applied instruments, apparatus, equipment, materials and preparations from materials or other objects (including software which is used for the efficient functioning of medical devices) which are devised by manufacturers to benefit humans via their designated function and serve the following purposes:

- *the recognition, prevention, supervision, treatment and alleviation of illnesses,*
- *the recognition, prevention, supervision, treatment and alleviation of or compensation for injuries or disa bilities,*
- *the investigation, the substitution or the alteration of an anatomical constitution or a physiological process,*
- *family planning or fertility treatment*

and whose intended main effect in or on the human body is achieved via neither pharmacologically nor immunologically active media nor via metabolism, but whose effectiveness can be supported by such media. “

Pharmaceutical Industry

The innovation process in the pharmaceutical industry is essentially driven by the advances of the Life Sciences. New methods and cognitions relating to the complex metabolic cycles in living cells, united cell structures, organs and living entities enable an increasing understanding of the formation of illnesses in detail and on the level of the molecules involved and the development of targeted treatments and medicines: In Germany today there are already 150 biotechnologically based medications with 93 licensed recombined active ingredients, which accounted for a good 10% of sales in chemists during 2006. Biotechnology is thus long since not just a vision of the future.

According to the company register at the Federal Department of Statistical Information, around 1,000 pharmaceutical companies are registered, which manufactured pharmaceutical commodities in 2006 with a value of just over €34 billion. In the same year around €4.3 billion was invested in research and development (R&D). Estimates assume that, of five to ten thousand new substances which are tested in the field of drug development, only one or two will ever reach the market as a licensed product. Conservative estimates assume development costs of at least several hundred million euros for new chemical or biological connections based on the medicines which are actually newly licensed.

Ancillary Industries

Biotechnology plays an important role as both cutting edge and cross sectional technology in the innovation and growth processes of several sectors. It disposes over enormous potential in the form of new or improved processes, products and services. New markets come into being and the competitiveness of important ancillary and user sectors (e.g. pharmaceutical and chemistry sectors) is strengthened. In this way, new workplaces are created and existing jobs secured.

Because of the increasing complexity and the necessity for interdisciplinary co-operation within the biotechnological innovation processes, many R&D projects will only be viable in well networked “innovation systems“ (among others between universities, public research facilities, companies, small and medium sized bio¬tech companies). Thus the close proximity of the industrial protagonists to the academic base of knowledge (among others to the fields of biology, chemistry, biochemistry, bioinformatics, and physics) is a decisive competitive advantage.

This shows the cross-sectional character of biotechnology and its existing and established great importance to sciences and workplaces in Germany. It is expected that this potential will increase still further. With a fast implementation on the market it can be calculated that up to around 600,000 workplaces in Germany will be directly related to biotechnology by 2020. The number of workplaces in the ancillary industries could rise to 680.000 over the same timeframe.

Within this report, user industries as well as upstream ancillary sectors have been incorporated in the statistics.

3. Life Science in Germany

According to Ernst and Young, German Biotechnology Report 2007, the biotechnology industry has stabilised itself in recent years and can look to the future with optimism. This confidence is drawn on solid progress in the areas of sales, product development and further corporate characteristics: Altogether the sector can show a much more clearly positive general mood than in previous years.

In spite of this positive trend, the general conditions for the German biotechnology sector have not necessarily improved. Liquidity problems and financial constraints are worries for many companies. Vital financial support sometimes does not flow smoothly, or the processes run slowly and often break down. Disappointingly unfulfilled expectations have scared off potential investors and led to reluctance to commit capital investments.

According to the classification of Ernst and Young the German biotechnology sector comprised approximately 400 companies at the end of 2007 (of which fourteen were from Mecklenburg-Vorpommern) with somewhat more than 10,100 employees. The turnover of the sector rose by 6% in comparison to the previous year to €1003 million. Over the same period, the outlays for research and development increased by 16% to €980 million. Following the strong growth period for the number of biotechnology companies in the period 1996 – 2000, there was a phase of stagnation from 2001 on, during which the numbers remained fairly constant and at the end of 2006 there were a total of 395 companies. The 10 newly founded companies in that year represent the lowest recorded level of newly established companies in the sector.

It is estimated that there are currently between 258,000 and 443,000 workplaces under the direct influence of biotechnology. The prospects for the future look promising: By 2020 several hundred thousand additional workplaces could be created in the sector. A considerably larger number of employees come to light when the user and ancillary industries are taken into account: A similarly large number, 169,000 to 350,000 jobholders can be attributed to the upstream user industries. They use biotechnical processes and products for their own production. Another 217,000 to 471,000 can be added to that from the workplaces in the supply industries which are indirectly affected by biotechnology. Among others these are suppliers of basic and raw materials as well as various service companies.

The medical technology sector displays an above average level of activity in the area of company foundations. From 1995 to 2002 a total of around 9,300 new companies were founded in the medical-technology fields in Germany. German medical technology companies achieve more than half of their sales with products which are less than two years old. The proportion of the production value attributable to research and development is more than double the average for industrial goods as a whole. Germany lies in second place behind the USA in the number of newly registered patents in the area of medical technology. Cell technology, biotechnology, new active ingredients and bio-materials are counted, among others, as key technologies in the field of medical technology. They are seen as being vital for the three main directions of future development in medical technology: computerisation, miniaturisation and molecularisation.

Everything that is against nature has no long term prospects of continued existence.

Charles Darwin, 1809 - 1882
British naturalist, evolutionary biologist and creator of Darwinism

4. Life Science in Mecklenburg-Vorpommern

Biotechnology and Life Sciences are traditionally based around the centres of the two university locations, Rostock and Greifswald with their respective medical and natural science faculties. With both these universities, plus the universities of applied sciences in Wismar, Neubranden-burg and Stralsund, as well as numerous non-university research institutes in the areas of agriculture and the environment, the state has the scientifically essential and economically relevant fields of knowledge within the Life Sciences well covered.

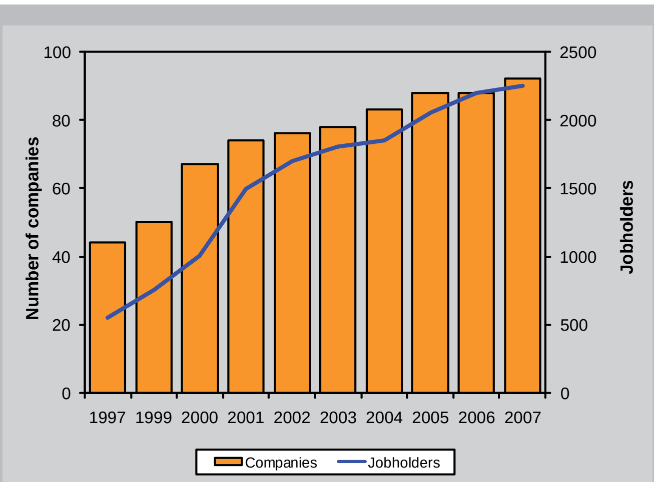

Fig.1 Number of companies and employees in the life science sector of Mecklenburg-Vorpommern

The state government of Mecklenburg-Vorpommern has actively accompanied the development of the sector for more than 10 years and in 2001, together with the BioCon Valley Mecklenburg-Vorpommern e.V. and numerous financial institutions, it founded the BioCon Valley® GmbH as an instrument of support and further development for the sector. The BioCon Valley Mecklenburg-Vorpommern e.V. has accumulated 163 members from the economy, colleges, research centres, clinics and even from the service sector and other areas such as hotels. The areas of competence of these members are not only networked in the field of Life Science, but since 2004 also in the area of health economy,

4.1 Overall Development

The overall development of the companies in Mecklenburg-Vorpommern can be regarded as eminently positive: From 1997 to 2007 the number of companies more than doubled, from 44 to more than 90. The number of employees rose from 550 to around 2,400 over the same period. If the same criteria are applied to the definition of the sector for the compilation of this report as were used in part 2, this broader categorisation, including the ancillary industries, gives a total of 134 companies in the state with around 2,500 employees occupied. This number cannot, however, be directly compared to the 92 recorded companies from 2007, since the criteria for collating the data have been revised in the meantime.

These companies consist primarily of small and medium sized companies with up to 50 employees. Six of the companies have more than 100 employees. The overwhelming majority of the companies (86 %) are structured as (public) limited companies (GmbH, AG in Germany). 9% of the companies are sole traders and partnerships, while the remaining 5% comprise hybrid forms (GmbH & Co. KG) and also those set up and run as limited companies.

4.2 Business Segments and Activities

If the companies of the Life Science sector are differentiated according to their business segments, (Fig. 2) then around 55% of the companies can be classified under the heading of biotechnology. Around 20% of the companies are occupied in the area of medical technology. Approximately 22% of the companies, which operate as advisors or in the areas of consultancy, laboratory equipment supply, programming for biotechnological applications and order research were classified under “other”. The companies classified under “pharmaceutical” accounted on the one hand, with 2%, for the smallest number of companies, but on the other hand, the number of employees was proportionately speaking, considerably higher.

It can clearly be noticed that increasingly more companies have extended their activities in such a way that they now overlap between various classifications. These companies can thus not be exclusively allocated to one particular field of operations.

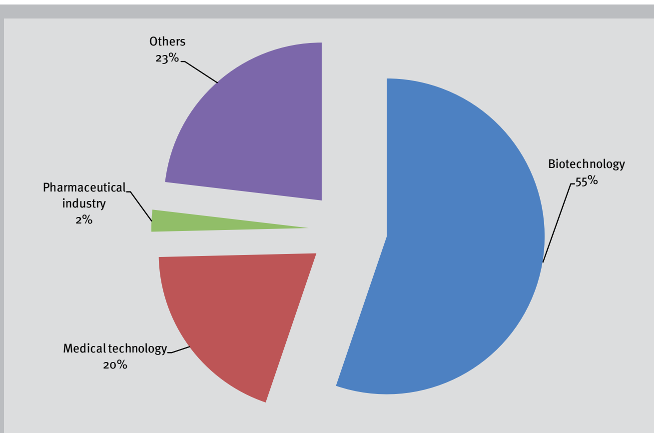

Fig. 2 Number of the companies (as percentage) in the fields of biotechnology.

Somewhat more than two thirds of the companies see their main field of operations as being in the medically oriented biotechnology, followed by the “grey” biotechnology with slightly more than 50%. Just over 50% of the companies regard their main activity as being in the remaining areas, consisting of agricultural biotechnology (22%), the consulting and advisory areas (16%), marine biotechnology and the industrial biotechnology (Fig. 3).

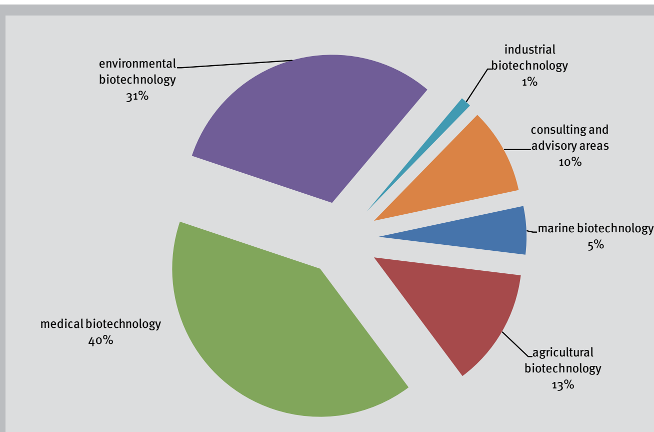

Fig. 3 Main activities of the companies (number of answers per field, multiple answers were possible)

The business activities of the companies are divided into two main areas (Fig. 4): According to this diagram, 69 of the companies regard themselves as being in the general service fulfilment sector, whilst 60 of them are occupied in research and development services. A little under half of the companies (45) manufacture products, while almost a quarter (23) regard their main activity as being of an advisory nature. It is noticeable that many companies see themselves as being active in several areas, so that only a rough picture of the actual main activities can be gleaned from the available information.

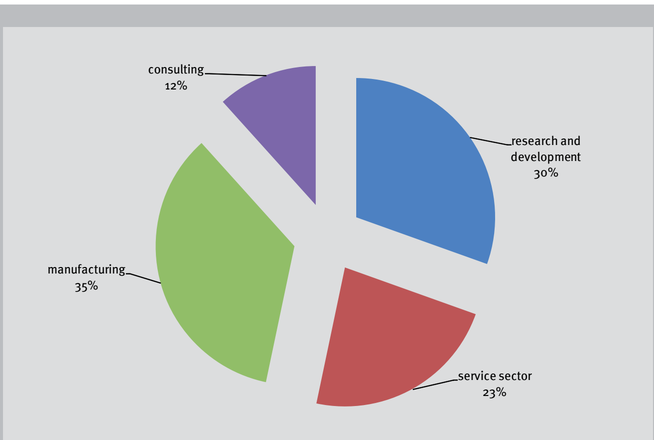

Fig. 4 Division of the companies according to business sectors (number of answers per field, multiple answers were possible)

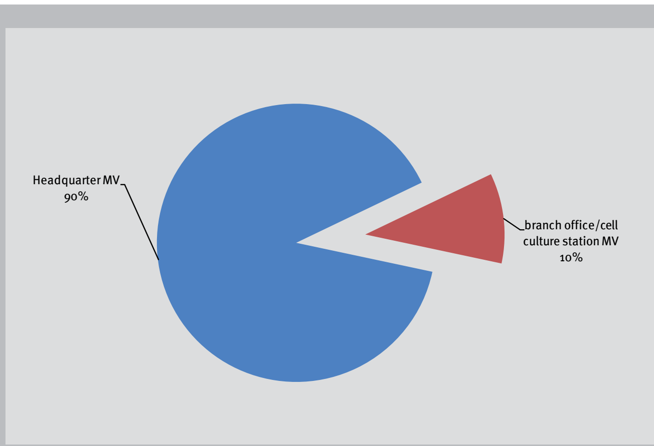

Fig. 5 Division of the companies according to head offices

4.3 Employees

Within the biotechnologically oriented companies there are approximately 1,000 jobholders (ca. 43% of all employees). This is followed by medical technology, in which field the companies occupy around 700 people (ca. 30%). According to the number of employees, the pharmaceutical sector, in which 600 employees (ca. 26%) work, comes next. The companies classified under "other" comprise a multitude of firms which employ only small numbers of people: The 37 companies of this category have ca. 250 employees (ca. 11%) on their books.

4.4 Head Offices and Locations

90% of the 134 recorded companies have their head offices in Mecklenburg-Vorpommern or are in the company registers there. Primary among these are the head offices of various seed-breeding companies in Mecklenburg-Vorpommern (Fig. 5).

Most of the companies are resident in the two university locations of the state, namely Rostock and Greifswald: with 34% in Rostock and 17% in Greifswald, a little over half of the companies are in one or other of these two locations (Fig. 6). 8% of the companies are located in Schwerin. 41% can be found in other locations, mainly Wismar, Neubrandenburg and Teterow.

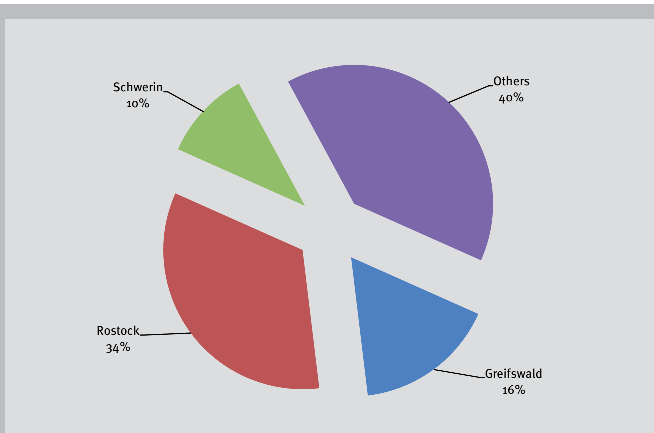

Fig. 6 Residences of the companies in Mecklenburg-Vorpommern

Within the state the technology centres and company foundation centres are of great importance as company locations. The possibility of basing the head office in a technology centre is taken up by young companies with great eagerness. Additionally, so-called “incubators” offer newly founded companies optimum general operating conditions by relieving the administrative burden, fulfilling management functions and generally making available their contacts for business and project initiatives.

4% of the companies (54 in number) in the Life Science sector are resident in such a “Incubator“. In this respect the technology park (TZW/TPW) in Warnemünde and the BioTechnikum (BTG) in Greifswald play a leading role: With respectively 12% and 10%, more than half of the companies which are resident in a technology centre have taken advantage of one of these two offers. Further such companies can be found in TGZ Schwerin, BMFZ Rostock, ABT Groß Lüsewitz, TZV Greifswald, BMTT Teterow, RIGZ Rostock and TIG Neubrandenburg.

GENERAL TECHNOLOGY CENTRES

- TGZ - Technologie- und Gewerbezentrum e.V. (TGZ locations: Schwerin, Wismar, Malchow)
- Technologiezentrum/Technologiepark Warnemünde (TZW/TPW, Warnemünde)
- Rostocker Innovations- und Gründerzentrum RIGZ
- Technologie- und Gründerzentrum Neubrandenburg (TIG, Neubrandenburg)
- Technologiezentrum Fördergesellschaft mbH Vorpommern (TZV, Greifswald)

LIFE SCIENCE TECHNOLOGY CENTRES

- AgroBioTechnikum Groß Lüsewitz (ABT, Groß Lüsewitz)
- BioTechnikum Greifswald (BTG, Greifswald)
- Biomedizinisches Technikum Teterow (BMTT, Teterow)
- Zentrum für Lebensmitteltechnologie Neubrandenburg (ZLT, Neubrandenburg)

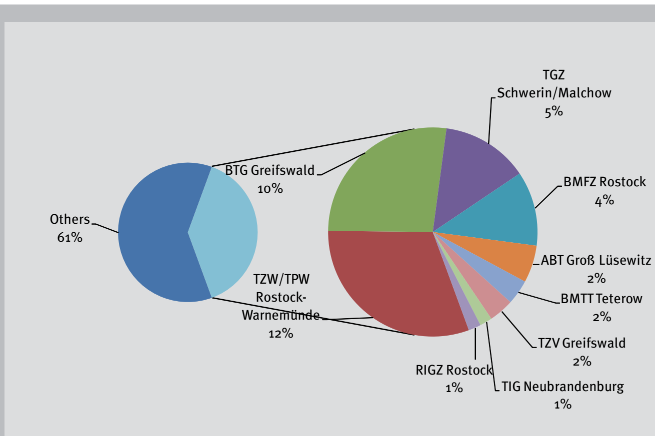

Fig. 7 Importance of the technology centres as company locations for the Life Science sector

5. Future Prospects

The Life Science sector, with the help of newly gained awareness, industry oriented research and new products, is now able to present itself more and more strongly – not least in the public perception.
A great degree of potential has been predicted for industrial biotechnology in the next few years: In the chemical industry it is firmly expected that the percentage share of biotechnological processes as a proportion of total sales volume will triple by the year 2020. Similar increases are also expected for most other sectors, in which the Life Sciences make an economic contribution.
According to a study by the Fraunhofer-Institute for System and Innovation Research (Fraunhofer ISI) in Karlsruhe and the German Institute for Economics (DIW), biotechnology secures and creates hundreds of thousands of workplaces in Germany alone. The chances of further expansion are good, and the potential for new workplaces - especially in the user sectors such as the food and pharmaceutical industries - is especially high.

An increasingly international cut throat competition, innovation cycles, increasingly demanding customer requirements and altered general business conditions have necessitated a state of permanent readiness to introduce and adapt new ideas, processes and technology - especially on the part of small and medium sized companies. In order to develop such an ability for innovation, the most important requirements, along with consistently undertaking further training, are co-operative measures on an internal and cross-company level. A growing ability to co-operate forms the basis for effective networks.

This, among others, is one of the reasons why Life Science companies are concentrated in a few close knit regions and also why these regions in themselves are the ones preferred. Locations for the companies are developing. At these locations, the know-how available in the form of specialised expert knowledge, as well as a suitable infrastructure, number among the most important production factors in the modern Life-Sciences. In addition to this expertise, scientists with the appropriate expert know-how still need information about potential markets for the products which are developed on the basis of this expertise. Furthermore, they must also dispose over the desire and readiness to implement and exploit this expert knowledge in a business-like manner. The Life Science location of Mecklenburg-Vorpommern is a positive example of this.

BioCon Valley® has played a leading role in actively crafting the international co-operative organisation ScanBalt. ScanBalt comprises a network of more than 40 Life Science regions and protagonists in the Baltic Sea area, one of the most dynamic growth areas in Europe. The growing close connections among the sciences, research and the economy as well as the administration, not only in the region but also and especially internationally, have created the best possible pre-requirements for the conversion of research results into top products and innovative services. These significantly contribute to the development of Mecklenburg-Vorpommern as a location and create and increase the state's competitiveness and attractiveness, not only domestically but also internationally.

ScanBalt BORDERLESS BIOTECH

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