Dresden.

Medical Technology

Maintaining Health: Medical Technology, the Industry of the Future

One in five workplaces in Germany is connected to the health industry. According to the report 'Economic Accounts for the Healthcare Sector,' by the Federal Ministry for Economic Affairs and Energy, the healthcare industry will continue to grow. People are living longer while at the same time care for the chronically ill has improved. Dresden's medical technology companies are significantly contributing to this development.

Medical technology has a wide range. It provides products and procedures that save lives, contribute to healing and, where healing is not possible, improve the quality of life. These products include equipment for diagnostics, from X-ray to laboratory machines; surgical instruments, from bone saw to operating table robot; and technology for intensive care. In addition, medical technology includes equipment for the cleaning and sterilization of medical instruments, laboratory diagnostics, operating table materials, bandages and dressings; and implants, from the pacemaker to artificial joints.

Billion Dollar Market: Medical Technology

According to the German Medical Technology Association (BVMed), in 2014, German medical technology producers earned a combined revenue of 25.2 billion Euro, with an export rate of 68 percent. The competitive position of German companies is excellent. Considering the number of patents and share of global trade volume, Germany ranks second behind the U.S.

Germany's medical technology sector is characterized by medium-sized businesses: 96 percent of companies that have a maximum of 250 employees. According to the BVMed report, in Germany, the medical technology industry employs 200,000 people in more than 12,000 companies. But these relatively small businesses should not be underestimated because the industry is growing dramatically and proves to be exceptionally strong in research and innovation. Dresden start-ups will, most likely, continue to be among the next successful group of entrepreneurs in the future.

Dresden: Excellent Industry Location and Expertise

Providing an outstanding environment for innovation, Dresden is an ideal location for medical technology as a growing industry for the future. Dresden has a unique combination of engineering tradition, especially modern microelectronics; a commitment to the biotechnology sector; and advanced medical research. In the project C3-Saxony, two organizations in the field, the technology cluster Silicon Saxony and biosaxony are collaborating on the advancement of

the development of interdisciplinary technologies. This project is funded by the European Union and coordinated by the Saxon Ministry of Economic Affairs.

Excellence University, TU Dresden: Optimum Conditions for High-tech Start-ups
At TU Dresden, East Germany's only university to be part of the government's Excellence Initiative, scientists are conducting pioneering research. The location's well-developed mechanisms to support technology transfer make it possible to turn research into market-ready products, and new enterprises. Scientists and students who plan to start a company find the necessary support for every step of the process. The initiative 'Dresden exists', for example, funds more than 50 projects a year, with about 20 start-ups emerging from these projects.

Technology-Solutions for an aging Society
Traditionally, the engineering sciences have been strongly represented in Dresden. An important partner to companies in the medical technology field is the Institute for Biomedical Engineering (IBMT) at TU Dresden Faculty for Electrical Engineering and Information Technology. One focus of the institute's research is to search for more cost-effective technologies in early detection, diagnostics and therapies of heart diseases. To help an aging society, engineers work on solutions in preventive medicine, for monitoring, ambient-assisted living, and telemedicine.

In order to provide the field with young medical technology researchers in the future, TU Dresden offers a specific course of study called 'Devices, Micro, and Medical Technology (GMM)'. This branch of study is part of the course of study for electrical engineering. Through its direct connection to the University Hospital, the IBMT has created optimum conditions for research and teaching.

Real-Time Diagnostics through Novel Cell Analysis
A spin-off of TU Dresden's interface between Information and Communications Technology and Life Sciences, Zellmechanik Dresden is launching a device capable of quickly and cost-effectively determining the mechanical qualities of cells. This novel procedure was developed by a research group led by Jochen Guck, Professor at the Biotechnology Center at TU Dresden (BIOTEC); which proves that research can indeed lead to a new start-up.

BIOTEC developed 'Real-Time Deformability Cytometry' (RT-DC) which does not need antibodies nor fluorescent or other external biomarkers to examine cells. The information exists within the cell itself and can be distinguished by mechanical characteristics. Cancer cells, for instance, are deforming much more easily than healthy cells and can therefore be more easily spotted. A high-speed camera can detect cell deformations in real-time, making it possible to measure the mechanical characteristics of several hundred cells per second.

Examining the blood, for instance, requires just one drop of blood, and characterizing all types of blood cells including their activation status, takes just 15 minutes.

This new procedure complements established approaches in medical diagnostics with a simple and directly accessible parameter, which helps to reduce additional and cost-intensive analysis.

Dresden offers substantial Key Technologies

Information and communications technology, cell and biotechnology, microsystems technology and nanotechnology are key technologies of the medical technology of the future; and, Dresden has substantial expertise in all of these sectors. In addition, Dresden has high-performance research institutes in material sciences and materials research and testing, including expertise in biocompatible materials. Collaboration between doctors and engineers, and networks across disciplines are the source of innovations in medical technology and one of Dresden's major strengths. The industry association Silicon Saxony and biosaxony, for instance, maintain close collaboration, and industry representatives and research institutes are interconnected within this network as well.

Strong Networks Dresden's Expertise

In Dresden, experts from science and industry meet regularly to discuss the most current developments and exchange ideas. The Research Association for Measurement-, Sensor-, and Medical Technology Dresden (FMS), for instance, regularly organizes important industry events like the Dresden Sensor-Symposium (its 12th in 2015) and the Dresden Medical Technology Symposium (the 5th event in 2014) which was dedicated to 'Biomedical Technology from Basic Research to Transfer'.

The expertise of Dresden scientists is also in high demand beyond the region. Dräger, for instance, a global leader in respirator production, realized a concept for variable ventilation of patients. The concept had been developed and patented by the Department of Anesthesiology and Intensive Care of the Carl Gustav Carus University Hospital, Dresden.

Saxony's year-long support and dedication has started to pay off for the Biotechnology sector as well. Only recently, Qiagen, a world market leader in the business segment of molecular diagnostics, and the biotechnology enterprise Biotype Diagnostic, have started a joint venture, Biotype Innovation, which is located in Dresden-Hellerau.